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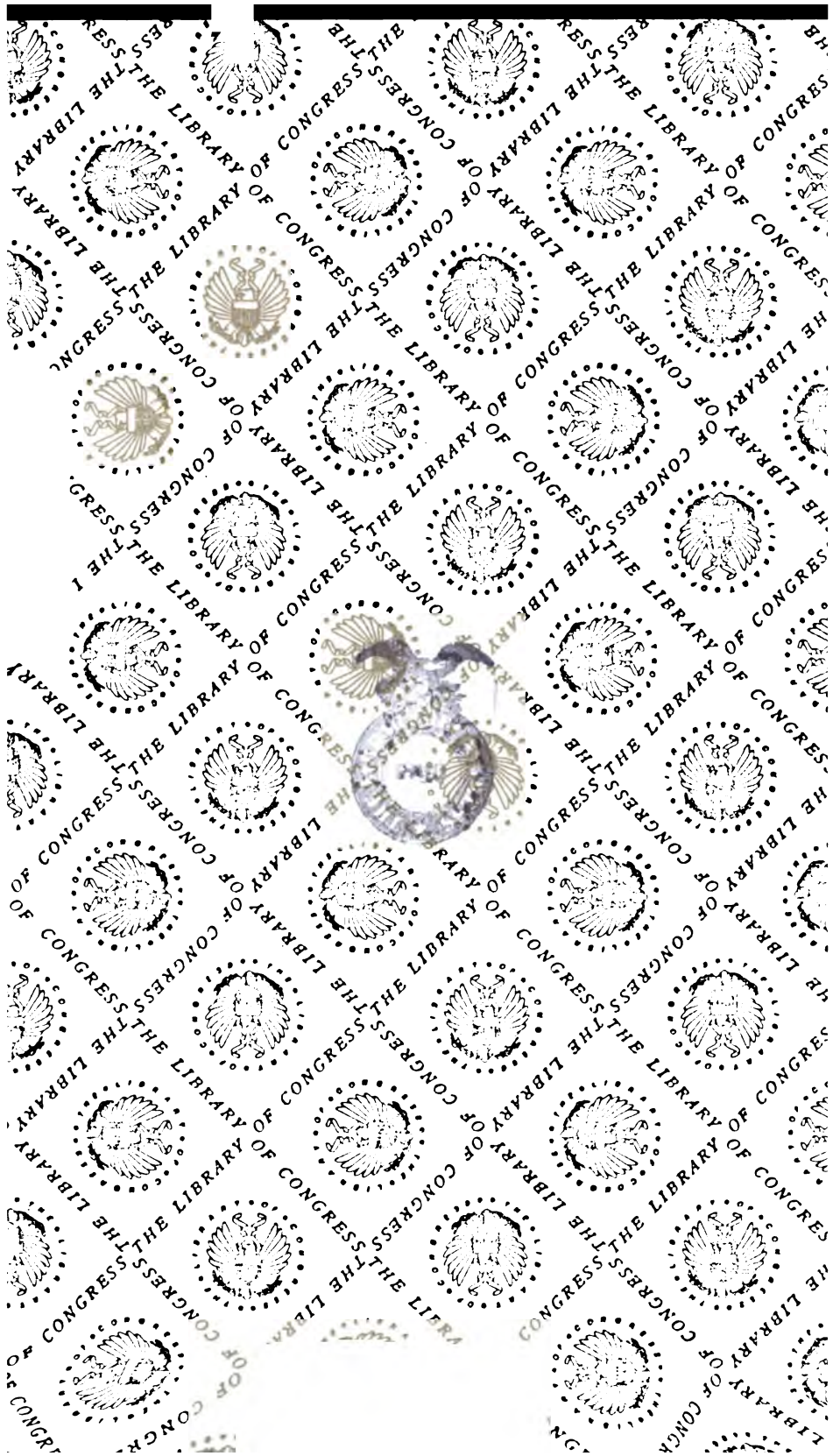
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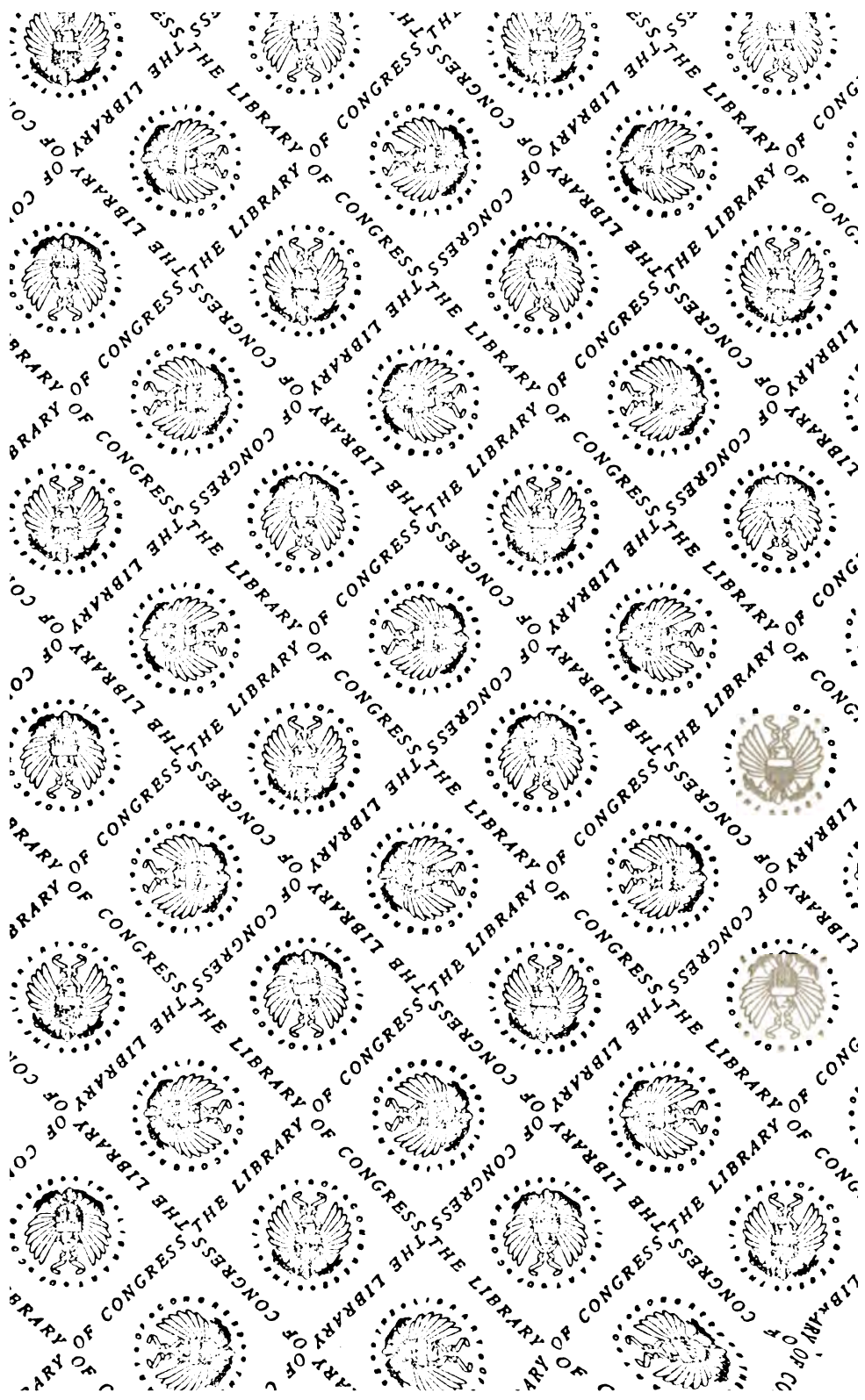
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HEARINGS

BEFORE THE

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COMMITTEE ON IRRIGATION OF ARID LANDS

OF THE

U. S. Congress.

HOUSE OF REPRESENTATIVES

RELATING TO

THE RECLAMATION WORK OF THE GOVERNMENT UNDER
THE NATIONAL IRRIGATION ACT.

APRIL 16 TO 30, 1906.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1906.

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RECLAMATION WORK UNDER THE IRRIGATION ACT.

COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Monday, April 16, 1906.
The committee met at 10.30 o'clock a. m.
Representatives Mondell (chairman), Reeder, Dwight,
Kennedy, and Smith.

OF HON. E. A. HITCHCOCK, SECRETARY OF THE
INTERIOR.

The CHAIRMAN. At the beginning of the hearing I wish to read to the committee, as the foundation for these hearings, a letter which, as chairman of the committee, I wrote April 6, as follows:

HON. E. A. HITCHCOCK,
Secretary of the Interior, Washington, D. C.

SIR: Early next week the Committee on Irrigation of Arid Lands of the House of Representatives will begin hearings, as has been the practice for several years past, relative to the work and operations under the national irrigation law, at which time, if it is convenient to you, the committee would be pleased to have you appear and make a general statement as to the situation with regard to the reclamation fund, the expenditures made under it, projects undertaken, and with regard to such matters in connection with the work of the service as you may desire to present for the information of the members of the committee.

It is the further desire of the committee that, at such times as may be mutually convenient, we may have before us the director of the reclamation service, Mr. Walcott, the chief engineer, Mr. Newell, and such other engineers and officers of the service as they may designate for the purpose of informing the committee relative to the details of the work of the service.

In order that the committee may have before it during its hearings information relative to the work of the service other than that contained in the fourth annual report of the reclamation service, advance copies of which we now have, we most respectfully request that a complete financial statement of the work of the service, in convenient tabulated form, and showing in reasonable detail all expenditures by projects, may be prepared, which will show the operations, expenditures, and balance down to as late a date as practicable and if convenient to the 1st of September last.

Also a statement of the form of organization of the reclamation service and the names of all employees of the service other than laborers, their rate of compensation and where employed, and such other information in a convenient form as in your opinion would be helpful to the committee in its hearings and review of the work of the service, it being the desire of the members of the committee to keep in close touch and in complete harmony with the reclamation work and to render every assistance possible in carrying out the development and extension of the work contemplated by the national irrigation law.

During the progress of the hearings the members of the committee will be pleased to hear any suggestions as to future legislation which may be helpful in the reclamation work and any modification of the laws relating thereto which, in the opinion of those connected with the service, would be helpful and beneficial.

I should be pleased to hear from you as to when it would be most convenient for you and members of the reclamation service to appear before the committee. Our regular meeting is Monday next, at 10.30 o'clock a. m. If it is entirely convenient for you to be present on that day, we would begin the hearings at that time; if not, at such day following as may be more convenient.

Very respectfully,

F. W. MONDELL,

Chairman Committee on Irrigation of Arid Lands.

In answer to that letter, gentlemen, the honorable Secretary has transmitted to the committee a statement, in detail, which is very full and complete, giving the information asked for in this letter, together with other useful and helpful information.

This statement I now lay before the committee. The Secretary of the Interior is now before us, and, Mr. Secretary, we shall consider the statement transmitted to the committee as your formal reply to our letter, if that is satisfactory to you, and we will be glad to hear from you further in regard to the work carried on by your Department under the reclamation act.

(The statement referred to is as follows:)

DEPARTMENT OF THE INTERIOR,
Washington, April 13, 1906.

HON. F. W. MONDELL,

Chairman Committee on Irrigation, House of Representatives.

SIR: Referring to your communication of the 6th instant, I am handing you herewith financial statement of the work of the reclamation service in tabulated form, showing in reasonable detail all expenditures by projects; also showing the operation, expenditures, and balance down to the 1st of January, 1906; also statement showing the form of organization of the reclamation service, the names of all employees of the service other than laborers, their rate of compensation, and where employed, and such other information as tends to give complete and detailed information of the character of the organization of said service.

Your attention is especially called to the tabulation on page 37, giving a recapitulation of the figures on pages 24 to 36, and to pages 38 and 43 and following, showing the organization of the service.

Very respectfully,

E. A. HITCHCOCK,
Secretary.

LETTER OF TRANSMITTAL.

SIR: In accordance with the instructions from the honorable the Secretary of the Interior, dated April 9, I am sending herewith a statement based on the sixteenth quarterly statement and estimate, showing the operations, expenditures, and organization of the reclamation service.

More complete details can be found in the Fourth Annual Report of the Reclamation Service, printed as Document No. 86, House of Representatives, Fifty-ninth Congress, first session.

Very respectfully,

F. H. NEWELL,
Chief Engineer.

HON. CHARLES D. WALCOTT,

Director of the Geological Survey.

INTRODUCTION.

The following statement of the work of the reclamation service is intended to supplement the annual reports, and particularly the fourth annual report, transmitted to Congress early in December, 1905. Reference is made in the following pages to these publications in order to avoid repetition.

The first portion of this statement describes in detail the recent operations on each project. This is followed by a statement of the expenditures up to the end of Decem-

ber, 1905, together with estimated expenditures during the quarter ending March 31, 1906, and also for the next quarter up to June 30, 1906.

A final statement is given in condensed tabular form on page 36 showing the total allotments and expenditures and the estimated balance by projects.

The organization of the reclamation service is given, showing the name, position, locality employed, and compensation.

FINANCES.

The following is a summary of the larger features:

Reclamation fund, estimated to June 30, 1908	\$37,076,108.02
Allotments on primary projects	\$36,419,161.00
Estimated expenditures on secondary projects, etc., to June 30, 1908	600,863.61
Balance	56,083.41
	<u>37,076,108.02</u>

On page 37 is given the allotment to primary projects, and on pages 37 to 38 the details making up the other totals.

The probable total receipts to the reclamation fund up to June 30, 1908, have been given by the Treasury Department and by the General Land Office as amounting to \$37,076,108.02. A detailed statement showing the estimated receipts and expenditures is given on page —. In this table only the amounts likely to be received from the sales of land have been considered. During 1906 and 1907, and more largely 1908, it is expected that the fund will be replenished by the collection of the cost of construction of several projects which will then be completed. The allotments now made and the proposed future allotments are shown in the following table, which is arranged by States in the order of magnitude of the allotment.

State.	Project.	Amount.	Total.	Per cent.
1. Arizona.....	Salt River.....		a \$4,539,161.00	12.8
2. Nebraska-Wyoming.....	North Platte.....		3,830,000.00	9.0
3. Montana.....	Huntley.....	\$900,000		
	Lower Yellowstone.....	1,200,000		
	Milk River.....	1,000,000		
	Sun River.....	500,000		
			3,600,000.00	9.7
4. Oregon.....	Klamath.....	1,000,000		
	Umatilla.....	1,000,000		
	Malheur.....	1,000,000		
			3,000,000.00	8.1
5. California-Arizona.....	Yuma.....		3,000,000.00	8.1
6. Nevada.....	Truckee-Carson.....		3,000,000.00	8.1
7. Idaho.....	Minidoka.....	1,300,000		
	Payette-Boise.....	1,300,000		
			2,600,000.00	7.0
8. Colorado.....	Uncompahgre.....		2,500,000.00	6.7
9. Washington.....	Okanogan.....	500,000		
	Tieton.....	1,000,000		
	Sunnyside.....	750,000		
			2,250,000.00	6.1
10. Wyoming.....	Shoshone.....		2,250,000.00	6.1
11. South Dakota.....	Belle Fourche.....		2,100,000.00	5.7
12. North Dakota.....	Pumping projects.....	1,000,000		
	Lower Yellowstone.....	700,000		
			1,700,000.00	4.5
13. Utah.....	Strawberry Valley.....		1,250,000.00	3.4
14. New Mexico.....	Hondo.....	240,000		
	Carlsbad.....	600,000		
	Rio Grande.....	200,000		
			1,040,000.00	2.8
15. Kansas.....	Garden City.....		280,000.00	.7
Unassigned balance of estimate			656,947.02	1.7
Total			37,076,108.02	100.0

a Letters of Director of December 26, 1905, and January 11, 1906, and letter of Secretary of March 7, 1906, Purchase of Arizona Canal System.

CONDITION OF WORK.

The following list gives briefly the present condition of the projects in the various States and Territories:

State.	Project.	Condition of work.
Arizona.....	Salt River.....	Under construction
California-Arizona.....	Yuma.....	Do.
Colorado.....	Uncompahgre Valley.....	Do.
Idaho.....	Minidoka.....	Do.
Kansas.....	Payette-Boise.....	Contracts awarded.
Montana.....	Garden City.....	Specifications prepared.
	Huntley.....	Under construction.
	Lower Yellowstone.....	Do.
	Milk River.....	Specifications being prepared.
	Sun River.....	Preliminary surveys completed.
Nebraska-Wyoming.....	North Platte.....	Under construction.
Nevada.....	Truckee-Carson.....	Do.
New Mexico.....	Hondo.....	Nearly completed.
	Carlsbad.....	Under construction.
	Rio Grande.....	Plans nearly completed.
North Dakota.....	Lower Yellowstone.....	Under construction.
	Pumping.....	Plans nearly completed.
Oklahoma.....	Red River.....	Feasibility doubtful.
Oregon.....	Klamath.....	Contracts awarded.
	Umatilla.....	Contract with water users pending.
South Dakota.....	Belle Fourche.....	Under construction.
Utah.....	Strawberry Valley.....	Plans almost completed.
Washington.....	Okanogan.....	Plans nearly completed.
	Yakima.....	Preliminary work nearly completed.
Wyoming.....	Shoshone.....	Under construction.

ARIZONA.

SALT RIVER PROJECT.

Past operations.—Past operations are described in the third annual report, second edition, pages 129–157, and in previous quarterly estimates.

Present conditions.—The cement mill has been in operation continuously during the past quarter and is furnishing cement of an excellent quality. About the middle of March, power was furnished the mill from the power canal, and the output immediately increased to a rate of approximately 10,000 barrels per month.

The power canal, with the exception of the work at the diversion dam and a part of one of the pressure pipes, was finished during this quarter. The work still remaining to be done in the power canal does not delay the operation of the plant, as the second line of pipe is required only when more than 2,500 horsepower is needed.

The sand-crushing plant is ready for operation, the quarry supplying it is opened up, and a large amount of rock quarried and ready for use.

J. M. O'Rourke & Co., contractors for the dam, lost all their temporary works, together with a large amount of machinery, in the great flood of November, 1905. By April 1 they will be again at work driving piles in the canyon, and hope during the next quarter to have the dam above water.

Future work.—During the next quarter the work under the present contracts will be pushed as rapidly as possible, as will such work as is undertaken under force account.

If it is decided to build the Arizona dam by force account, work will be begun early in April and every effort made to complete the dam in time to furnish water for next year's irrigation. The farmers under all canals on the north side are suffering greatly from the lack of water, and the temporary work they are now doing will afford them only sufficient water to save their trees, their more permanent improvements, and their cattle.

SAN CARLOS PROJECT.

No work has been done on this project except stream measurements. Two gauging stations have been established on the upper Gila, and the station at San Carlos has been abandoned. During the next quarter no other work will be done except the stream measurements.

LITTLE COLORADO PROJECT.

This project was described in the third annual report and in previous quarterly estimates. Four gauging stations are still being maintained on the Little Colorado River and its tributaries, but no further work is contemplated except stream measurements.

SAN PEDRO PROJECT.

This project was described in the second and third annual reports and is mentioned in previous quarterly estimates. With the exception of stream gauging no further work is contemplated for the next quarter.

CALIFORNIA.

YUMA PROJECT.

Past operations.—The general features of the Yuma project and past operations have been described in the third annual report, second edition, pages 192-202, and in the fifteenth quarterly statement and estimate.

Present conditions.—Construction of the Laguna dam has been continued by the contractors, J. G. White & Co., 43 Exchange place, New York City, and it is estimated that by the end of the current quarter approximately 23 per cent of the entire work will have been completed.

Work has been carried on mainly from the Arizona side. Failure of the excavating machinery on the California side has greatly delayed operations. Another dredge is now in operation, and progress should be nearly doubled. It is improbable that construction can be carried on without interruption because of the annual high water from about May 1 to July 30; also because of excessive summer temperatures during July, August, and September.

Construction of the Yuma Valley dike has continued by the contractors, Miller & Peasley, Los Angeles, Cal., and it is estimated that the work will be completed by the end of the current quarter; not on contract time, however. High water has interfered with this work and the contractors have requested an extension of time.

It is estimated that 2,500 barrels of cement will have been delivered by the Pacific Portland Cement Company, San Francisco, Cal., at the end of the quarter. The cement is being tested at the Berkeley laboratory, and the expense is included in the estimate.

It is proposed to extend the Yuma Valley dike about 1 mile during the current quarter; the earth work will be done by informal contracts and the clearing and grubbing by force account, as provided for in the fifteenth quarterly estimate. The immediate construction of this extension is urgent, in order to protect the farms from the next annual overflow.

Construction by force account of spur dikes to regulate the cutting of the Colorado River is under way, the expense of which was provided for in the fifteenth quarterly estimate.

Plans and specifications have been completed for the Gila Valley dikes and for the Gila crossing. Studies of the design of lateral-canal system to be constructed in the Yuma Valley are under way. The topographic survey of the east part of the Yuma Valley will be completed during the current quarter. Designs have been completed for the proposed conduit in the main canal through the town of Yuma (Yuma conduit). The buildings of the reclamation service at Yuma have been painted. Tools and implements for carrying on a limited amount of force-account work have been purchased. Bids for the construction of the Laguna sluice gates and regulators were opened on February 28, 1906, at Los Angeles, Cal.

Future work.—During the next quarter work on the Laguna dam will be prosecuted as rapidly as possible. It is expected that the contract for the Laguna sluice gates and regulators will soon be let and that work will begin during the next quarter. The delivery of cement will continue as required by the various structures under construction.

It is proposed to construct the Gila crossing during the winter of 1906-7. All work on the Gila crossing must be delayed until the Gila Valley dikes, for the control of the river, have been completed as far down stream as the site of the crossing. It is proposed to construct the dikes by force account during the next six months. This has been authorized by the Secretary of the Interior.

The Yuma conduit is of such design and so located that it may be desirable to construct it by force account; it may also be desirable to excavate the heavy cut across the reclamation service reservation in Yuma by force account.

Additional spur dikes to regulate the cutting of the Colorado River may be necessary. If needed, their construction is of such a character that it is desirable to construct them by force account, as is being done at present.

The Yuma Valley dike should be extended as far as possible (probably about 5 miles) before high water in the Colorado River, which will occur in May. It is proposed to let the earthwork in short sections by informal contracts. It is desirable to do the clearing and grubbing by force account.

An estimate is included in the financial statement for all the force account work mentioned above.

Part of the options for canal right of way through Yuma and in the vicinity will be obtained during the next quarter. Payment should also be made on all approved right-of-way purchases heretofore made.

SACRAMENTO VALLEY PROJECT.

Past operations.—Past operations are described in the third annual report, second edition, pages 66 and 67, and in the fifteenth quarterly statement.

Present conditions.—During the field season of 1905 reconnaissance was made in the Feather and Yuba River watersheds. Numerous reservoir sites were found in the Feather River basin. Several of these had been surveyed by private parties, and copies of the topographic maps of American Valley, Spanish Ranch Valley, and Bucks Valley were purchased and arrangements made for obtaining the maps of the east arm of Big Meadows and Butte valleys.

Preliminary estimates of cost of irrigating works for irrigating a portion of the west side of the Sacramento Valley as far south as Orland have been made. Gauging stations were established on the North Fork of the Feather River, on Indian Creek near Crescent Mills, and Grizzly Creek near Beckwith.

Future work.—During the next quarter it is proposed to prospect with diamond drill for bed rock at various dam sites in the Sacramento basin, and location surveys will be made for a diversion canal to take water from the Sacramento River above Red Bluff.

OWENS VALLEY PROJECT.

Past operations.—Work in the Owens Valley has been fully described in the thirteenth and fourteenth quarterly estimates.

Present conditions.—The work of stream gauging by the reclamation service in the Owens Valley was discontinued January 1, 1906, but river gauging stations are being maintained by the Geological Survey.

Future work.—No work is contemplated on this project for the next quarter.

SAN JOAQUIN VALLEY PROJECT.

Past operations.—General descriptions of this project have been given in the thirteenth and fourteenth quarterly estimates. No work has been done on the project during the current quarter.

Future operations.—No work is contemplated on this project for the next quarter.

GENERAL OFFICE.

General supervision of the projects in California is carried on from the Los Angeles office. This work includes a supervision of expenditures, checking of plans and estimates of the projects under construction, and general details of the other projects. The San Francisco office was closed December 31, 1905, and Mr. S. G. Bennett, in charge of investigations on the Sacramento Valley project, was transferred to Los Angeles. The work of preparing reports on the Sacramento Valley project is now being carried on at the general office.

The expenditures of the Los Angeles office are distributed 40 per cent to the Klamath project, 20 per cent to the Sacramento Valley project, and 40 per cent to the Yuma project and are included in the estimates for these projects.

COLORADO.

UNCOMPAHGRE VALLEY PROJECT.

Location and past operations.—Past operations are described in third annual report, second edition, pages 214 to 227.

Present condition.—Work on the Gunnison tunnel is well under way. About 10,500 feet, or 33 per cent of the excavation, has been made.

In heading No. 1 an excessive flow of water was encountered in January which

delayed progress and increased expense. In heading No. 4 the greater portion of the tunnel section is now in shale. In heading No. 2 the progress has amounted to over 800 feet per month. This is probably a world's record in tunnel progress.

During the quarter numerous additions have been made to the mechanical equipment, and the organization has been brought to a state of efficiency which compares favorably with the best contracting outfits.

Orman & Crook have worked during the quarter on six sections of the south canal. They are well advanced in tunnels 1, 2, and 3, and have the masonry placed in a considerable portion of the work. Present indications are that Orman & Crook will not be able to finish their contract on time.

The segregation of the irrigable lands under the project has been completed. Plans are underway for a complete system of laterals, involving the use of such canals as are already constructed.

On February 6 bids were opened for furnishing cement, and the contract was awarded to the McPhee & McGinnity Company, Denver, Colo., for \$1.43 per barrel f. o. b., Iola, Kans.

Future work.—Routine progress on the Gunnison tunnel and south canal should prevail during the coming quarter. There is no new work to be taken up, and it is expected that the plans for the distribution system will be complete before the end of the quarter.

GRAND RIVER PROJECT.

This project was described in the third annual report, second edition, page 227, and in previous quarterly estimates. No field work has been done during the present quarter and none is contemplated for the next quarter.

WHITE RIVER PROJECT.

This project is described in the third annual report, second edition, pages 228-229, and in previous quarterly estimates. No field work has been done during the present quarter and none is contemplated for the next quarter.

COLORADO RIVER STORAGE PROJECT.

This project is described in the third annual report, second edition, pages 229-230, and in the fifteenth quarterly estimates. No field work has been done during the present quarter and none is contemplated for the next quarter.

IDAHO.

MINIDOKA PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 231 to 237, and in previous quarterly estimates.

Present conditions.—During the present quarter work has been concentrated on the dam in Snake River and on rock excavation along the main canals. Earth excavation was entirely suspended during January and a part of February on account of freezing weather. The masonry dam in the diversion channel has been completed, the five 8 by 12 foot coffin gates have been successfully installed, and Snake River is now diverted from its natural channel. It has taken longer to reach this stage of the work than was at first estimated, but only a limited number of men could be employed at one time on the concrete work, and further work on the dam proper had to be practically suspended until after this structure was completed.

Work on the earth portion of the canals was resumed about the middle of February. Orman & Crook should complete 75 per cent of their work by the end of March. It is doubtful if they will finish their contract by June 1, but they will not greatly exceed this limit. Hubbard & Carlson should have 60 per cent of their work completed by the end of this quarter. These contractors will finish all of their work during the month of May, perhaps somewhat before the time set for completion. Monarch & Porter are greatly behind on their work. They have lately arranged for better financial support, and will be prepared to greatly increase their force, so that by the end of this quarter 30 per cent of their work should be completed. It is extremely doubtful if their work will be finished on time, but it is believed that work will be pushed so that the delay will not seriously interfere with the plans of the settlers.

Shop drawings of all gates and lifting devices to be furnished by the Vulcan Iron Works have been prepared, and the gates and devices will be delivered in time for their installation.

It is expected that work on the canal structures will be well underway before the end of this quarter.

The settlers who have located on the town sites are deeply interested in the matter of the opening of these sites to sale and settlement. It is hoped they can be opened without much further delay, so that all business interests may be settled and established upon a normal basis.

Future work.—It is expected that by the end of the next quarter practically all of the work under the existing contracts will be completed. In all probability some of the grading work will be unfinished by that time, but this will be confined chiefly to the lower portion of the distributing system, and it is hoped that all of this work will be done before the water reaches the extreme lower end of the laterals. It is also expected that the town sites will be opened and all business interests satisfactorily adjusted and established. Before the expiration of the quarter work will be well underway on the sublateral system. In order to furnish employment to as many settlers as possible it is proposed to do this work on force account.

PAYETTE-BOISE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 238 to 257, and in previous quarterly estimates.

Present conditions.—On December 27 the Secretary of the Interior authorized the advertisement for bids for the construction of the first division of the works under this project, the bids to be opened at Boise on February 1, 1906. Bids were submitted for the construction of a dam in Boise River, upper and lower Deer Flat reservoir embankments, a portion of the main canal between Indian Creek and Deer Flat reservoir, structures for the main canal, and gates and lifting devices, but no qualified bid was received for 20 miles of the main canal between Boise River and Indian Creek. The Board of Engineers recommended that the lowest qualified bids be accepted for all schedules.

Schedule 1, dam and diverting works on Boise River, was awarded to the Utah Fireproofing Company; schedule 3, main canal from Indian Creek to Deer Flat reservoir, was awarded to Conway & Wilhite; schedule 4, structures on canal from Boise River to Deer Flat reservoir, was awarded to Page & Brinton; schedule 6, lower Deer Flat embankment and diverting works, was awarded to Hubbard & Carlson; schedule 7, gates and lifting devices, has been awarded to the United Iron Works, Oakland, Cal. As the bids for schedule 2, main canal between Boise River and Indian Creek, and schedule 5, upper Deer Flat embankment and diverting works are in excess of the engineers' estimate contracts were not made for these schedules. Schedule 2 has been readvertised and bids will be opened April 16; the work under schedule 6 will be done by force account.

On March 9 bids were opened at Boise for furnishing 14,000 barrels of cement, to be used on this project. Only one bid was received, that of the Portland Cement Company, Denver, Colo. A recommendation has been made that this bid be rejected and the cement purchased in the open market.

Hubbard & Carlson and Conway & Wilhite began the installation of their plants and the construction of work almost immediately upon the acceptance by the Secretary of their bids, not waiting until the contracts were signed, so that the work is already in progress on the lower Deer Flat embankment, the main canal between Indian Creek and Deer Flat, and the Boise River dam. In pursuance of the Secretary's order that the reclamation service proceed with the construction of the upper Deer Flat embankment on force account steps have been taken for the purchase of the necessary equipment for this purpose, notice having been sent to the manufacturers of steam shovels and other necessary appliances, and arrangements made for the opening of bids at Chicago on March 15, 1906. These bids will call for the immediate delivery of all necessary equipment.

Satisfactory progress has been made in the settlement of rights of way. Contracts have been entered into with twenty-seven owners of land on Deer Flat, and notice has been served by the register and receiver of the United States local land office on holders of homesteads to show cause within sixty days why their homestead entries should not be canceled. Every tract of improved land in this reservoir site has been contracted for but one, and it is believed that this tract can be secured on reasonable terms. It is hoped that satisfactory arrangements can be made with the remaining owners of unimproved land without resorting to condemnation proceedings. The New York Canal Company and the Idaho-Iowa Lateral and Reservoir

Company have executed contracts substantially in a form which has been approved by the Secretary, providing for the turning over of their main canal and right of way of the same to the United States, to be enlarged as provided by the plans of the reclamation service.

These contracts have been forwarded to the chief Engineer's office for final approval of the Secretary. In entering into this contract these companies have made concessions of great value to the United States. No compensation is to be paid, but the United States is left free to enlarge the existing works to any dimensions which may be desired without being hampered in any way by the present owners. Six miles of the New York Canal is of full dimensions and was constructed at a cost of more than \$200,000. It is estimated that fully this amount is saved by this arrangement with the New York Canal Company in the construction of the main south side canal.

The Payette-Boise Water Users' Association will, during the present quarter, execute a contract with the Secretary of the Interior which will define the relations to exist between the association and the United States. Contracts will be entered into between the Water Users' Association and several irrigation associations whose works will become a part of the general system of irrigation which is being planned. These contracts are in form which has been approved by the reclamation service.

Future work.—It is expected that during the next quarter work on all portions of this project will be well under way under the terms of the contracts already let. About 30 per cent must be completed by June 30.

DUBOIS PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 257 to 259.

Present conditions.—Field operations in connection with this project were completed during the quarter ending December 31, 1904. Office work was completed during quarter ending March 31, 1905.

Future operations.—It is anticipated that no work will be done on this project during the coming quarter.

KANSAS.

GARDEN CITY PROJECT.

Location and past operations.—See third annual report, second edition, pages 280 to 290, and previous quarterly statements and estimates.

Present conditions.—The Water Users' Association at Garden City has submitted subscriptions for about 12,000 acres of land for this project, from which the acreage under the project will be selected. A project board met at Garden City on February 14, 1906, and passed upon specifications for the power plant and for the electrical and pumping machinery. Bids will be called for to be opened at Chicago on May 28, 1906.

Future work.—Contracts for the other work on this project will be let as soon as practicable. It is expected that during the current season a large percentage of the work on the project can be got under way. A residence and offices to be occupied by the operating engineer for this project will be constructed at Deerfield immediately and several wells will be constructed on force account.

Contracts and expenditures anticipated for the coming quarter will be on account of power plant, electrical machinery, pumps, pump houses, power house, conduits, wells, inverted siphon, railway siding, and the necessary expenditures for right of way.

MONTANA.

HUNTLEY PROJECT.

Past operations.—Past operations are described in the third annual report, second edition, pages 326 to 330, and previous quarterly estimates.

Present conditions.—There are eight contracts in force covering the construction work for this project. It is contemplated to submit specifications for a pumping plant in the near future.

W. D. Lovell, contractor for structures on the main canal, has put in two sets of concrete bridge piers for the 42 and 60 foot span steel bridges and has built the first culvert under the Chicago, Burlington and Quincy Railway.

On the contract for division 2, main canal, Mr. Lovell has a 2½-yard scoop excavator built ready for the heavy cuts and has part of his supplies for the team work and is ready to begin when the weather is favorable.

The Illinois Steel Company has delivered six cars of cement on contract, the tests on which have been satisfactory.

Contract for divisions 1 to 5 of the distributing system was awarded to the Piper Brothers Company and signed by the Secretary of the Interior January 17, 1906. The contractors are putting up camps and have four grading outfits nearly ready for work on the distribution system. One outfit started to work on February 28, but had to quit on account of snow.

The contract for a telephone system was awarded the Piper Brothers Company and signed by the Secretary of the Interior January 13, 1906. The contractors have been delayed in starting work on this contract by the difficulty of securing poles. Some of the other material has been delivered, however, and the contractors seem to be making every effort to carry on the work.

Callahan, Katz, Phelan & Shirley, contractors for division 3, main canal, have not started work, but have been notified to be on the ground with an adequate force by the middle of April.

Division 1, main canal, was readvertised and bids were opened January 15. The contract was awarded to Hughes & Olson. The contractors have not yet started work.

A contract for steel, gates, etc., on the distribution system was awarded the New Jersey Foundry and Machine Company, and signed by the Secretary of the Interior January 15, 1906.

The preliminary surveys for the distribution system have been carried on successfully all winter and are now nearing completion.

A large amount of extra design work has been necessary to complete satisfactorily the designs for the pumping plant; these plans will be sent in for advertisement before April 1.

Future work.—During the next quarter all the contract work will be under active construction. It will be considered especially important to get the work on division 1 well started and to have the new channel of Pryor Creek completed. There will be about 50 miles of laterals to be cross-sectioned, in addition to the regular field engineering and inspection during the quarter.

MILK RIVER PROJECT.

Location and past operations.—This project has been described in the third annual report, second edition, pages 291 to 307, and in previous quarterly estimates.

Present conditions.—The Secretary of the Interior, on January 15, 1906, approved the preparation of specifications and the advertising for bids for the construction of the canal from St. Mary River to the North Fork of Milk River.

Specifications have been prepared for a telephone line from Browning to St. Mary River; thence along the proposed canal line. The total estimated cost of this telephone system is approximately \$20,000. The construction of a commercial telephone line between Browning and St. Mary Lake is under consideration by a private company. Arrangements for service between these points may possibly be made with this company, in place of the Government constructing a line.

Adjudication of Milk River water rights has been carried on, with the expectation that the case would be called for trial March 26, but a postponement has been requested by the attorneys because of a recent decision by the United States circuit court of appeals.

Future work.—In the next quarter final specifications and drawings of the canal from St. Mary River to north fork of Milk River will be completed and passed upon by a board of engineers, and it is expected that bids will be advertised for. It may be advisable to construct a portion of the canal by force account.

Plans and specifications for buildings, offices, commissaries, dormitories, and other buildings to be erected at Browning and at the St. Mary Lakes will also be finished, ready for advertisement or for construction by force account.

Permanent camp and construction buildings will be erected at St. Mary Lakes and at such points along the canal line as required.

A conference has been arranged for the engineer in charge of the project and the chief engineer of the Indian Department to consider and arrange terms for reserving flowage lands and right of way for canal across the Blackfeet Indian Reservation.

SUN RIVER PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 307-313, and in previous quarterly estimates.

Present condition.—This project was authorized by the Secretary of the Interior

March 19, 1906, and \$500,000 was allotted to it. All preliminary and location surveys necessary for a close preliminary estimate of cost and acreage have been prepared.

Future work.—During the next quarter final surveys will be made, the irrigation system will be designed, and hydrographic investigations will be continued.

CROW RESERVATION PROJECT.

Past operations.—Past operations are described in previous quarterly reports and in the third annual report, second edition, pages 328 to 329.

Present conditions.—No field work is being done on this project at present. The field notes of the Sanders Low Line Canal, as surveyed last fall, have been plotted up, and a close estimate can be made if construction is decided upon.

Future work.—Until the general policy has been decided upon, very little work can be done. It is expected that a consulting board will go over the Fort Custer plans and view the ground.

MADISON RIVER PROJECT.

Past operations.—Past operations are described in the third annual report, second edition, page 330, and in previous quarterly estimates.

Present conditions.—During the present quarter work on plans, estimates, and computations in connection with the preliminary surveys has been continued.

Future work.—During the quarter ending June 30, 1906, work on plans and computations in connection with preliminary surveys, estimate and report will be completed.

LAKE BASIN.

Past operations.—Past operations are described in the second annual report, page 352, and in previous quarterly estimates.

Present conditions.—During the current quarter office work has been in progress in connection with preliminary surveys, estimates, and report.

Future work.—During the next quarter work will be done on plans and computations in connection with preliminary surveys estimate.

CLARK FORK PROJECT.

Location and past operations.—Past operations are described in the fourteenth quarterly estimate and statement.

Present operations.—During the present quarter work has been done on the plans and estimates for diversion canal and distribution of water.

Future operations.—The preparation of plans and estimates for canal and distribution of water will be continued and a barometer reconnaissance will be made of the east side of Clark Fork in Montana and Wyoming. Stream gaging work will also be carried on.

NEBRASKA.

NORTH PLATTE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 331 to 337, and in preceding quarterly estimates.

Present conditions.—At the Pathfinder dam temporary dams have been constructed both above and below the dam site, and the water of the North Platte River passes around the dam site through the tunnel. A pumping plant has been installed at the dam site to pump out the seepage water. A suitable and efficient plant has been installed at the dam, which includes power, storage for cement and other supplies, ample camp and commissary facilities, cableway, derricks, and crushing plant and apparatus for mixing cement and concrete. Work is in progress on excavation for foundations of the dam. Negotiations have been closed for the acquisition of about two-thirds of the lands in private ownership required for the Pathfinder reservoir.

Excavation on the first 45 miles of the interstate canal was begun in June, 1905, and has proceeded with increasing forces to date, 55 per cent being completed on March 1 and 75 per cent will be completed March 31, and 100 per cent on May 1, in compliance with the supplemental contracts entered into early in January, 1906. One thousand teams are now on the work. Work on the structures, contracts for which were let to W. O. Morrison November 30, 1905, are under way and 20 per cent will be completed March 31. Work on the temporary structures for carrying water during the season of 1906 has been begun. The work on the second 50 miles

of the canal was begun March 1 with a small force; the final location and surveys and cross sectioning is about completed.

The plans, specifications, and advertisement for the first system of laterals, covering 40,000 acres between the Nebraska-Wyoming State line, are completed and ready for submission.

Future work.—It is expected that several thousand cubic yards of rubble masonry will be laid at the Pathfinder dam during the quarter.

During the next quarter excavation on the first 45 miles of the interstate canal will be completed, 50 per cent of the structures will be completed, and the outlet conduits will be built by force account. Work will be under good headway on the excavation on the second 50 miles. Bids for the first system of laterals and diversion dam will be asked for and contracts let. The survey of the second system of laterals, covering 30,000 acres, will be begun. The planting of trees and grass and building of fences for protection of the canal will be undertaken. The lateral head gates, waste gates, safety, and sand gates will be designed and put in when possible.

SOUTH PLATTE UNDERFLOW RECONNOISSANCE.

Past operations.—The field work is described in the fourteenth quarterly statement and estimates.

Present condition.—During the current quarter the field notes have been worked up for final report, which will soon be submitted.

Future work.—It is not contemplated to do any future work on the above reconnaissance after final report is prepared.

NEVADA.

TRUCKEE-CARSON PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 344-359, and in previous quarterly estimates.

Present conditions.—Telephone work has been discontinued for winter. The line to 853 "L" (2 miles) was put in during the current quarter. Line from Truckee, Cal., to the Truckee diversion dam has been surveyed and material ordered for its early completion in the spring. Construction by force account of lateral canals has been continued during quarter. All excavation in "D" and "E," subdivisions of district 1, is completed. Main distributing canal, district 3, is excavated and practically the entire north half of this district has been excavated by force account. About the middle of January, 1906, floods on Carson River stopped force account work on the Old River Channel Canal, consequently the stock, about 200 head, was moved on to district 3 with a view to completing the upper end of this division by force account. This work is now completed as far as excavation.

The location of lateral canals on district 7 was begun, and is being pressed forward with a view to getting the greater part of the district ready for water during the next quarter.

Building of structures in district No. 1, "D" and "E" subdivisions, was started early in quarter and is progressing satisfactorily. Under present conditions the purchase of some 300 head of stock for force account has been postponed.

The contract with Edward Malley for the Lake Tahoe outlet and regulating works has been canceled. During the quarter six parties have been making surveys for letting contracts, etc., in the Carson Sink Valley; one party has been engaged on surveys in district No. 7.

The proposed survey for the Lovelock branch canal has been abandoned for the present.

Districts 4, 5, and 6 have been classified so as to get information for the location of lateral system.

During the current quarter the maintenance and operating department has been materially increased and is working in a satisfactory way. A small grading force has been furnished the maintenance and operating department for work of repair, etc.

Future work.—Bids will be opened April 19 for the construction of lateral system to irrigate about 25,000 acres in district No. 3.

Force-account work in district 3 on structures will be started during quarter with a view to getting water on some land this year; also, construction of lateral systems in district 7 will be carried forward as fast as possible.

Plans and specifications will be worked up for the lateral systems in districts 4 and 5 during next quarter.

WALKER RIVER PROJECT.

This project has been described in previous quarterly estimates. No work has been done during the last quarter and none is contemplated for the next quarter.

NEW MEXICO.

HONDO PROJECT.

Location and past operations.—Past operations are described in the second and third annual reports and in former quarterly estimates.

Present conditions.—Work on the distributing system was commenced by T. F. Cazier, March 5. Earthwork for embankments Nos. 1, 2, 24, 3, and 5 is completed; that for No. 4 is about 25 per cent completed. Rippapping on embankments Nos. 1 and 2 has been finished; that on No. 5 will be completed during March. All excavation on the inlet canal has been done. Scour gate No. 1 and spillways Nos. 1 and 2 have been completed. Delay in the delivery of steel has retarded the completion of scour gates Nos. 2, 3, and 4 and of the silt weir, which it is hoped to finish in April. Work on the outlet canal has been delayed by overflow from river, but it is expected that it will be completed in April. The work on outlet pipes, tower, and gates and bridge is progressing satisfactorily.

Future work.—The remainder of the system will be completed during the next quarter, the main features to be taken care of being the structures for the inlet canal; the rippapping of embankment No. 4, the remaining earthwork in the latter; the distributing system covered by Cazier's contract, and the completion by force account of drops, gates, and diversion weirs. It is anticipated that the total cost of this project will be greater than the allotment. This is due largely to the fact that the bid of the Taylor-Moore Company for earthwork and riprap was very low, and the work has actually cost the United States more than the contractor estimated, due in part to delay incident to legal complications. The outfit and machinery of the Taylor-Moore Construction Company was also inadequate. In addition, the cost of labor and forage has risen and the unusual floods of the Hondo River have deposited large amounts of silt in the outlet canal. The extra expenditure at the present time will not cause any notable extra cost, as it is covered by the bond of the Taylor-Moore Construction Company.

CARLSBAD PROJECT.

General description, etc.—Past operations are described in previous quarterly estimates.

Present conditions.—Owing to delays in perfecting title to the property purchased by the Government, construction was not authorized until February 24, 1906. Proposals on supplies, machinery, and equipment had previously been obtained, and renewals were at once asked for. Orders have been placed with the Western States Portland Cement Company, Independence, Kans., for 6,200 barrels of cement, and with the Friestedt Interlocking Channel Bar Company for 12,236 square feet of steel sheet piling. Orders have also been placed for stone crusher, concrete mixer, gasoline engines, centrifugal pumps, scrapers, plows, tools, and lumber. Work has been begun at the gates of McMillan dam, on the regrading and concreting of the Black River canal, and a storehouse for cement and other supplies. Work on the concrete aqueduct is about to begin. Bids for Avalon dam will be opened April 12. The remainder of the work is to be done by force account.

Future work.—During the next quarter work will be pushed vigorously by force account on the gates at McMillan dam, the aqueduct, the crossing at Dark Canyon, and the canals. Bids will be opened on April 12 for Avalon dam, and the contractor will probably get to work with a full force and equipment early in June. No water will be available for summer crops in 1906, nor would it be possible to begin now and do the work by force account in time to furnish water for crops this year. This could not have been done without beginning construction with full force and equipment before January 1, 1906.

RIO GRAND PROJECT.

Location and past operations.—These are described in preceding quarterly estimates and in third annual report.

Present conditions.—During the present quarter the Secretary of the Interior has modified the terms of his prior approval of the Leasburg diversion dam, in such manner as not to require a bond, but to accept a contract from the Water Users'

Association as sufficient security, and to allow the usual ten years' time for repayment. The Elephant Butte and El Paso Valley Water Users' Associations have taken proper action and signed contracts as required. A map of the valley is being made from a point about three-fourths of a mile above Penasco Rock to a point 2 miles below the Leasburg site to show recent changes in the river bed and to furnish data for a proper plan of river control, the object being to keep the river against the west bluff in this part of the valley. The map will also furnish data for considering the feasibility of making the diversion at Penasco Rock, as the Santa Fe Railroad is now being removed from its location along the river bank at that point, allowing a canal to be constructed on the ground which has heretofore been occupied by the railroad. A consulting board will soon be called to approve plans and specifications preparatory to advertising for bids for construction of the diversion dam.

Future work.—During the next quarter it is expected that a contract will be let and construction begun.

URTON LAKE PROJECT.

Location and past operations.—Past operations are described in the second and third annual reports and former quarterly estimates.

Present conditions.—No further work has been undertaken since the issue of the last quarterly estimate, except stream measurements.

Future work.—It is improbable that any work will be undertaken during the next quarter except measurements of flow of the Pecos River above this project, which will be continued in order to obtain data as to water supply and general investigation on the Pecos watershed.

LAS VEGAS PROJECT.

Location and past operations.—Past operations are described in second and third annual reports and former quarterly estimates.

Present conditions.—No further work has been undertaken upon this project since the issue of last quarterly estimate except stream measurements.

Future work.—It is improbable that any work will be undertaken during the next quarter upon this project, except the continuation of stream measurements and such other investigations as may be ordered in getting the project ready for approval at some future date when funds will be available.

LA PLATA VALLEY PROJECT.

This project has been described in the third annual report, second edition, pages 392 to 394, and in previous quarterly estimates. No field work has been done during the present quarter, and with the exception of stream gauging none is contemplated for the next quarter.

NORTH DAKOTA.

LOWER YELLOWSTONE PROJECT.

Location and past operations.—Past operations are described in the third annual report, pages 420-427, and in preceding quarterly estimates.

Present conditions.—Work at the headworks by Charles Stabern, contractor, is progressing slowly. The Widell-Finley Company, which was awarded contracts for division 1, Schedule A, and for divisions 5 to 9, and laterals A to M and O and P, passed into the hands of a receiver on February 15. This company had not started work on divisions 5 to 9 or on the lateral system, but had made good progress on division 1, Schedule A, having 29.2 per cent completed on February 15. The Secretary of the Interior on February 28, 1906, suspended the contract with Callahan Bros., Phelan & Shirley, for Schedule A, divisions 2, 3, and 4 since they refused to go on with the work. Plans and specifications have been readvertised and bids will be opened April 12. Bids for the Lower Yellowstone dam, opened on December 5, were rejected and new bids will be asked in a short time. Bids were opened on March 12 for steel for concrete reinforcement. One field party has worked throughout the quarter reestablishing missing section corners and ascertaining the acreage in each legal land subdivision.

Future work.—On April 12 bids will be opened for cement, for structures on divisions 5 to 9, and on laterals A to P, and for divisions 2, 3, and 4, main canal. Construction work will be continued throughout the quarter on Schedule B divisions 1, 2, 3, and 4. Work on contracts of the Widell-Finley Company will be readvertised or carried on under force account. The routine work of the project will go on as usual.

WILLISTON DISTRICT PROJECTS.

BUFORD-TRENTON, WILLISTON, AND NESSON SUBPROJECTS.

Location and past operations.—These three projects are located in Williams County on the north bank of Missouri River. It is proposed to pump water from Missouri River into canals crossing the valley and bench lands.

The Buford-Trenton subproject begins within a mile of the Montana line and extends east about 12 miles. The Williston subproject surrounds the city of Williston and extends about 10 miles up the valley of Little Muddy River. The Nesson subproject is about 25 miles southeast of Williston and about 15 miles south of Wheelock Station, on the Great Northern Railroad. The areas under them are as follows: Buford-Trenton subproject, about 11,000 acres; Williston subproject, 14,000 acres; Nesson subproject, 12,000 acres. The proportion of estimated irrigable area in private ownership is about 84.5 per cent for the Buford-Trenton subproject, 87 per cent for the Williston subproject, and 90 per cent for the Nesson subproject.

Past operations.—Plane-table surveys of the projects were made during the season of 1905, and subsequent office work has been devoted to locating canal systems and pumping plants on paper, estimating quantities, and preparing specifications.

Present conditions.—The Buford Trenton and Williston Water Users' Associations are about to vote on the question of authorizing a contract with the Secretary of the Interior for the construction of irrigation works. Specifications are being completed ready for advertisement as soon as contracts are signed and the construction work authorized by the Secretary of the Interior. On March 10, 1906, the proportion of lands in private ownership signed up in the water users' associations was as follows: Buford-Trenton subproject, 83 per cent; Williston subproject, 84 per cent; Nesson subproject, 10 per cent.

Future work.—Work during the next quarter will include detailed surveys of the pumping-plant locations; detail plans and estimates of buildings and machinery; borings and test pits at pumping-plant sites and on locations of canals and structures; surveys of irrigable areas not fully covered by last season's work; stream gagings and force-account work preliminary to beginning the work by contract, such as road building, investigation of gravel and sand for concrete, etc. The estimates have been made for the Williston district projects as a whole. During the next quarter the expenditures will be analyzed by subprojects, and it is expected to submit separate estimates in the next quarterly statement.

BISMARCK PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, page 442.

Present condition.—During the last quarter the main work has consisted of stream measurements and designs of the necessary work.

Future work.—During the next quarter it is proposed to make estimates, plans, and specifications for the pumping station, to continue the stream-gauging work and to make a study of the best method of distributing the water over the land.

LITTLE MISSOURI PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 447 to 450.

Present condition.—No field work has been carried on during the past quarter.

Future work.—In the next quarter the work will consist of examination of the land and investigation of the water supply.

OKLAHOMA.

RED RIVER PROJECT.

Location and past operations.—Past operations are described in preceding quarterly estimates.

Present conditions.—During the present quarter investigations have continued along lines considered necessary for determining the feasibility of this project. The last of the diamond-drill borings were completed on February 17, and the drill was boxed and stored at Lugert, Okla. The borings at that point developed good, sound bed rock, but at a depth as great as that at the Navajo dam site. Canal surveys have been extended into Comanche County, with a view of including a larger percentage

of sandy soil and planning a 100,000-acre project if the water supply is found sufficient. Triangulation stations have been partly set for a topographic survey of the irrigable lands. Preliminary work has been done on an investigation of the feasibility of irrigation with the quality of water that will be available from Red River. The proposed plant will also determine the duty of water. An office has been established at Snyder.

Future work.—During the next quarter it is proposed to continue the topographic surveys and to investigate the adaptability of the salt water of the river for irrigation purposes. It is proposed to purchase a 6-inch centrifugal pump, a 25-horse-power gasoline engine and to perform a small amount of force-account work in connection with the investigation.

OREGON.

KLAMATH PROJECT (OREGON-CALIFORNIA).

Past operations.—Past operations are described in the third annual report, second edition, page 202 to 213, and in the fifteenth quarterly statements and estimates.

Present conditions.—Contracts for the construction of the main canal on the lower Klamath project were awarded January 24 by the Secretary of the Interior. Mason, Davis & Co., Portland, Oreg., secured schedules 1, 2, and 3, which include the construction of the main canal and all auxiliary structures except the bridges. Schedule 4, consisting of bridges, was awarded to the International Contract Company, Seattle, Wash. Mason, Davis & Co. filed their bonds, which were approved, and their contract was signed by the Secretary of the Interior February 18.

The winter has been severe, and field operations, except the hydrographic work, were entirely suspended and in all probability will not be taken up during the current quarter. Bids for the furnishing of 8,000 to 10,000 barrels of cement will be opened at Los Angeles March 18.

The papers relative to the Little Klamath Irrigating Company (Adams canal) have been corrected as requested, and are now the second time before the United States Attorney-General. The abstracts relative to the Klamath Falls Irrigating Company (Ankeny canal) have been corrected and returned, and agreements have been reached with the majority of the claimants to the minor vested rights from this canal, in the town of Klamath Falls, as requested by the Assistant Attorney-General. The abstracts and agreements of the Klamath Canal Company have been corrected, and were taken to the United States district attorney's office at Portland, Oreg., on March 30, 1906. The abstract of title for the Clear Lake reservoir, which the Government is under contract to purchase from S. L. Akins, is not yet complete, but will be submitted through the regular channels to the Secretary of the Interior when completed. A great many agreements for the purchase of rights of way for the main canal, east branch, south branch, and Keno canals have been secured and submitted for approval. As soon as approved abstracts and deeds will be submitted.

Plans and detail specifications for the construction of the east-branch canal as far as Olene, the south-branch canal as far as Merrill, and the lateral and drainage system for 13,000 acres of land between Klamath Falls and Olene have been prepared, and will be submitted to a board of consulting engineers about April 1. In this is involved the construction of 18 miles of main canal, 37 miles of laterals, and 11 miles of drainage canals.

Offices are maintained at Klamath Falls and also at the headquarters camp, at which the men are being temporarily subsisted.

Future work.—Field work, consisting of the final location of canals and laterals and cross-section work connected with the main canal will be taken up April 1. About April 15 construction work on the main canal will, in all probability, be begun.

UMATILLA PROJECT, OREGON.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 468 and 469, and in previous quarterly estimates.

Present conditions.—The project was approved by the Secretary of the Interior, December 4, 1905, subject to certain conditions which it is expected will be complied with in the immediate future.

Plans and detail drawings for Cold Springs reservoir dam have been practically completed and approved in general by a board of engineers February 17. Final surveys for feed canal to reservoir are being made and plans and detail drawings will probably be completed during the present month. Topographic survey of irrigable lands is about two-thirds completed. No work has been done during the present quarter on the hydrographic surveys referred to in last quarterly statement.

A Umatilla River Water Users' Association was formally organized on January 13 with a capital stock of \$540,000, divided into 9,000 shares of a par value of \$60 per share. There is now committed to the project, either by subscription to the water users' association, by separate contract with the United States, or as Government land that is either unentered or will necessarily be relinquished, 18,500 acres out of a gross area of approximately 25,000 acres. A memorandum of agreement has been made with the Northern Pacific Railroad Company for about 2,000 acres additional, and there is every assurance that not less than 2,000 acres more will be added as soon as certain legal matters can be arranged. Options have been obtained on all patented land falling within the proposed reservoir, except a small tract of a few acres for which negotiations are now pending. Negotiations are being taken up to acquire right of way for feed canal.

Future work.—Plans and detail drawings, with specifications, for Cold Springs reservoir embankment will be completed and it is expected that bids will be advertised for in the near future. This will be followed by advertisement for bids on feed canal.

The topographic mapping of irrigable lands will be completed, a hydrographic survey of the area now irrigated from lower Umatilla River will be made, and stream and ditch gauging work will be carried on.

MALHEUR PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 463 to 468, and in previous quarterly estimates.

Present conditions.—Work on this project has been discontinued for the present, stated in the last quarterly statement. Practically all office work necessary for filing of data has been completed.

Future work.—During the following quarter the time of one man for a few weeks will be required in the office compiling a report. Stream gauging will be continued as in last quarter. Additional survey and drill work may be required in connection with Warm Springs reservoir site. Examination of land entries will also be required from time to time.

CENTRAL OREGON RECONNOISSANCE.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 469 to 476, and in previous quarterly estimates.

Present conditions.—No projects are recommended for early construction, owing both to want of funds and lack of sufficient water-supply data. An assistant hydrographer is employed in the field in stream-gauging work and reconnoissance.

Future work.—During the coming quarter stream-gauging and reconnoissance work will be continued. Additional examination of land entries will be required from time to time.

SOUTH DAKOTA.

BELLE FOURCHE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 477 to 491, and in previous quarterly estimates.

Present conditions.—The work on the construction of the main supply canal has not progressed as fast as it should have during the past quarter, as the weather has been exceedingly fine. The construction of the diverting dam and structures on the main canal is in about the same condition as at the end of the last quarter, although almost enough rock has been crushed and hauled to the works to complete the concrete. The diverting dam is about 50 per cent completed. The Crow Creek sluice excavation and cofferdam has been partly completed, but no concrete has been put in on either work on account of freezing weather.

The excavation of the supply canal by the Widell-Finley Company is about two-thirds completed. Most of the finishing work and about 250,000 yards of material are yet to be moved. Receivers were appointed for the Widell-Finley Company on February 15. They continued the work until March 5, when they ordered all operations to cease. Very little progress was made after the company went into the hands of the receivers. This work will have to be readvertised or carried on by force account. With the amount of holdback, the bond and January and February estimates unpaid to the company, the Government is amply protected from any loss.

The equipment on the work, which will be taken charge of by the Government, consists chiefly of two steam shovels, one tippie for handling the dirt from the steam shovel, one outfit of cars and track, one traction engine and two graders, 15 teams of

horses and necessary wagons, scrapers, and machinery for supplying equipment to about 100 teams, together with boarding house and commissary.

Orman & Crook began work on the Belle Fourche dam and Outlet canals during past quarter and their progress has been satisfactory. Considerable equipment has been received, consisting chiefly of one 75-ton steam shovel, two locomotives, thirty cars, one steam roller, trackage and facilities for handling dirt from the steam shovel. Steam shovel was transported to its first work and commenced digging material the first part of March. They have built a reservoir on Owl Creek and have installed pumping plant and pipe system for furnishing water to the camp and supplying water for boilers, sprinkling, etc., on the work.

W. H. Crumb & Co., who constructed the Belle Fourche telephone system, have been paid and the Government released from future obligations.

On February 6 bids were opened for 20,000 to 30,000 barrels of cement and the contract awarded to the Western Portland Cement Company, of Yankton, S. Dak., at \$2.43 per barrel f. o. b., Belle Fourche.

Extension of time was granted both S. R. H. Robinson and the Widell-Finley Co. on their contracts on the main supply canal to May 30, 1906.

Farm unit maps were transmitted to the Washington office and if approved will be filed at once.

Agreements have been secured for all right of way for the south canal except through two tracts of land and for all right of way for Belle Fourche reservoir except from two owners. Land needed above the diverting dam has all been secured except from one owner, and this will probably have to be condemned.

Settlement under the project has been delayed considerably on account of homesteaders not knowing where to make their improvements. As soon as the farm-unit maps are filed and the settlers amend their present filings the land will be quickly taken up by the homesteaders.

Future work.—The placing of concrete masonry in diverting dam and structures on supply canal will begin early in March, and the structures will be pushed to completion as rapidly as possible.

The excavation of the supply canal will be continued by force account or the work will be readvertised.

The contract for the construction of the south canal and structures and lateral system, covering about 20,000 acres of land, will probably be let during the coming summer. It is expected that a camp will be established on the south canal about April 1 and the cross-section work begun so as to be ready for the contractor as soon as this work is let. Orman & Crook should begin to make good progress on their contract during this quarter, and if additional plant is received without too much delay they should soon be in full operation on the dam, as well as the north and south canals. Other work on the project will be carried on as rapidly as possible, as outlined in the past.

UTAH.

STRAWBERRY VALLEY PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 508-514, and in the fifteenth quarterly estimates.

Present conditions.—The contract with the Water Users' Association has been modified and completed in accordance with the Department requirements.

All of the stock of the association has been subscribed, and 92 per cent of lands under the project have been covered by contracts.

At a meeting of a board of engineers February 19-22, consisting of J. H. Quinton, W. H. Sanders, A. E. Chandler, and George L. Swendsen, all matters relating to the water rights and stock subscriptions were thoroughly canvassed and conclusions reached that the conditions laid down by the Secretary of the Interior in his letter of December 15, 1905, are fully satisfied.

The stock subscriptions are now being carefully checked in preparation for public record.

Future operations.—As soon as weather conditions will permit it is expected that the following work will be undertaken: (1) Construction of camp buildings; (2) construction of roads; (3) construction of telephone line; (4) construction of tunnel.

The camp buildings, roads, and telephone line can probably be begun in April, but it is not expected that extensive work on the tunnel can begin before June.

BEAR LAKE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 514-544, and in former quarterly estimates.

Present conditions.—The reconnaissance of this project shows it to be very complex, but one of great possibilities. During this quarter a report has been made on the possibilities of developments of small areas around Evanston, Wyo., and the general hydrographic inquiry has been continued.

Development of parts of the project by private capital will probably be undertaken at an early date, and undoubtedly some sections can be developed more profitably by this means.

Inquiry into power possibilities along the Bear is also very active, and unless the greatest care is taken by interested landholders, serious complications to future irrigation development will result.

Future operations.—Further extensive inquiry into this project is not contemplated in the near future, but it will be desirable to continue the hydrographic inquiry and probably to make a reconnaissance of conditions in the vicinity of Evanston, Wyo.

UTAH LAKE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 494–508, and in previous quarterly estimates.

Present conditions.—No work has been done on this project during the last quarter and none is in contemplation. For the present at least this project is not considered feasible.

WASHINGTON.

OKANOGAN PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 606–609, and in previous quarterly estimates.

Present conditions.—All preliminary surveys and investigations have been completed. The project has been approved by the Secretary of the Interior, subject to certain conditions which it is expected will be complied with in the immediate future. The plans and specifications for storage works and diversion canal are nearly completed.

An Okanogan Water Users' Association has been organized, with a capital stock of \$500,000, divided into 10,000 shares of the par value of \$50 per share. There is now committed to the project 12,000 acres of land, the total number of acres for which water is available being 8,650.

Options have been obtained for all the land required for storage purposes except a few acres, for the acquisition of which negotiations are now in progress.

Future work.—During the coming quarter it is intended to design the distribution system and locate the main canals. It is also expected that toward the end of the quarter some of the actual construction of the storage works and diversion canal will be commenced.

YAKIMA PROJECT.

This project comprises several subprojects or divisions which are considered below.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 611–625, and in the fifteenth quarterly estimates.

KITTITAS DIVISION.

Present conditions.—No work has been done on this division during the last quarter.

Future work.—Other than stream and ditch gaging no work is contemplated during the coming quarter.

TIETON DIVISION.

Present conditions.—This division was approved by the Secretary of the Interior December 12, 1905, subject to certain conditions, which it is expected will be complied with in the near future, and \$1,000,000 has been set aside for its construction. The adjustment of water rights, which was one of the conditions, has practically been accomplished. The triangulation for control of the topographic work is nearly completed and the actual topographic work will begin shortly.

Future work.—During the coming quarter it is proposed to complete the topographic survey of the irrigable lands, to make a farm-unit survey of the entire area, and to commence the final location of canals. In addition to this a water users' association will be organized.

SUNNYSIDE DIVISION.

Present conditions.—This division was approved by the Secretary of the Interior December 12, 1905, subject to certain conditions, which it is expected will be complied with in the near future, and \$750,000 has been set aside for its construction. As the complete adjustment of the water rights in the Yakima Valley had not been effected by January 1, the option for the purchase of the Sunnyside canal for \$250,000 was not exercised, but an extension was secured to April 1, 1906. Such repairs of the canal as are absolutely necessary were made by the Washington Irrigation Company, but no structures were renewed.

Future work.—A topographic survey of the irrigable lands under the canal, and other surveys, will be made, designs of some of the structures of the enlarged canal will probably be completed, and a water users' association will be organized.

LEDBETTER DIVISION.

Present conditions.—An estimate and report, based upon the preliminary surveys made last summer, was rendered in January. This completed the preliminary investigations of this division and all work has, therefore, ceased for the present.

Future work.—No further work on this subproject is planned for the coming quarter.

STORAGE RESERVOIRS.

Present condition.—Investigations for bedrock were completed for the lakes at the head of the Yakima River and some studies were made of temporary dams that would be required to meet the early needs of the Tieton and Sunnyside divisions.

The ownership of the lands about the lakes has been ascertained and efforts are being made to secure the options for the purchase of these same lands. Water-right matters affecting the lakes have also been investigated, but no definite agreements have been entered into.

Future work.—During the coming quarter it is proposed to make borings and detail surveys at the Bumping Lake dam site, and at one or more of the other lakes detail surveys will also be made with a view to the early construction of a temporary dam. Work in connection with the purchase of lands about the lakes and with the adjustment of water rights will be continued.

MISCELLANEOUS.

Gauging of important rivers and of canals and ditches concerned in the water rights adjustment along Yakima and Naches rivers, in the Yakima Basin, will be continued.

PALOUSE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 600-605, and in previous quarterly estimate.

Present condition.—During February a reconnaissance was made to determine land to be restored to entry. All work has ceased at present.

Future work.—No further work on this project is planned for the present, except that incidental to previous work and any general reconnaissance that may be required.

PRIEST RAPIDS PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 609-611, and in the fifteenth quarterly estimate.

Present conditions.—The field work of a very thorough preliminary survey of this project has just been completed. These surveys contemplated two gravity lines, one on the east side and the other on the west side of the Columbia River, as well as several pump lines with lifts up to 290 feet. It was found that from 45,000 to 150,000 acres might be reclaimed, depending on the pump area it may prove economical to include. It is expected that the report and estimate based on these surveys will be completed before the close of the present quarter.

Future work.—No further work during the coming quarter is proposed unless the conditions imposed for the final approval of the Yakima project can not be complied with, in which event further work on the Priest Rapids project will be vigorously pushed.

WYOMING.

SHOSHONE PROJECT.

Location and past operations.—Past operations are described in the third annual report, second edition, pages 626–631, and in previous quarterly estimates.

Present conditions.—During the present quarter Prendergast & Clarkson, contractors for the construction of the Shoshone dam, continued work on the outlet tunnel and temporary diverting works. Charles Spear, contractor for the construction of the Corbett tunnel, carried on work excavating adits, excavating main tunnel from two headings at adit No. 1 and in installing boilers, machinery, erecting buildings, etc. The delivery of cement and lumber began during the quarter, authority for the purchase of these materials in open market having been obtained in the previous quarter. Buildings for the use of the engineering force employed during the construction of the Corbett tunnel and Garland canal have been completed. These buildings were constructed by force account. Plans and specifications for the construction of about 7 miles of the Garland canal have been prepared. Plans for gates at the outlet of Shoshone reservoir have been recommended by a board of consulting engineers.

No field work has been carried on during the quarter with the exception of the engineering work necessary for the construction of the Shoshone dam and Corbett tunnel. The contractor for the Shoshone dam has failed to complete the temporary diverting works and outlet tunnel in the time specified in his contract. Payments for the purchase of lands covered by the Shoshone reservoir are being made as rapidly as the purchases are approved. Borings to determine the character of the foundation at the Corbett diversion site have been made.

Plans and specifications for the Corbett diversion dam have been prepared and now await consideration by a board of consulting engineers.

Future work.—The construction of the outlet tunnel, temporary diverting works, excavation of spillway, etc., of the Shoshone dam will be carried on during the next quarter, also the construction of the Corbett tunnel. Field work for locating the distributing system of canals for the Garland flat will begin. Additional quarters for engineers employed during the construction of the Garland canal will be required during the next quarter, also extension of present telephone line. Plans and specifications for structures along the Garland canal will be prepared. Payments for the purchase of lands covered by the Shoshone reservoir will continue during next quarter.

DE SMET PROJECT.

Location and past operations.—Past operations are described in previous quarterly reports.

Present conditions.—There has been no work done during quarter ending March 31, 1906, except stream gaugings. These have been carried on continuously, as the determination of the water supply is a most important element in the development of the project.

Future work.—It is expected that a consulting board will carefully investigate and report on the project before the end of the next quarter.

GENERAL ADMINISTRATION.

ORGANIZATION.

The organization of the Reclamation Service is described at some length in Water-Supply Paper No. 93, page 29. While left more or less flexible in order to meet varying conditions, yet there has been all along a purpose to hold each man responsible for work to which he was assigned and to which his services and expenses have been charged. The engineer in charge of a section of work is required to report on its cost and his salary is made a charge against it. The engineer in executive charge of a project may charge his services to the general administration of such project to be thereafter apportioned to the various integral parts of the project. The salaries of supervising engineers and their office assistants are charged against the projects under their supervision. For this reason the estimates heretofore made for the Denver, Los Angeles, Salt Lake, and other offices are omitted and estimates sufficient for these items are included under the various projects.

WASHINGTON OFFICE.

The general administrative expense can not be assigned so directly as the above charges. Accordingly, an estimate is inserted for general administration. The

expense is analyzed along the lines of executive direction, land and legal matters both in Washington and in the field, correspondence and records, auditing, disbursing, and bookkeeping, purchases and property records, and drafting, engraving, and photography. The actual expenditures under this estimate are distributed at the end of each quarter over the approved projects on the basis of estimated cost.

EXPERT ENGINEERING.

At times the consulting engineers and experts of the service are called together as boards working upon a project as a whole or certain features thereof. At other times they are employed upon general investigations having a value for all projects and not made directly for any one. Such charges are therefore of a general nature, and an estimate is accordingly made for these expenditures, to be quarterly prorated over the projects upon which work has been done. This expense is analyzed along the lines of consulting engineers, land classification and subdivision, diamond drilling, testing materials, and technical review.

FINANCIAL STATEMENTS.

ARIZONA.

Salt River project.

Total expenditures to end of last quarter, December 31, 1905.....	\$1,986,561.68
Estimated expenditures during current quarter ended March 31, 1906.....	392,088.32

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	15,000.00
2. Wages—foremen, mechanics, laborers, etc.....	120,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	15,000.00
4. Expendable supplies, fuel, explosives, etc.....	7,000.00
5. Materials—cement, lumber, steel, trees and piles, etc.....	25,000.00
6. Equipment—machinery, tools, wagons, animal, etc.....	20,000.00
7. Purchase of lands, rights of way, etc.....	15,000.00
8. Cement-mill operation.....	45,000.00

Total engineering force account, administrative, etc.....	262,000.00
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Contract for construction with—

9. J. M. O'Rourke & Co.....	\$60,000.00
10. C. R. Fager & Co.....	30,000.00
11. Wolf Sachs.....	10,000.00
12. Stillwell-Bierce & S. V. Co.....	3,445.00
13. Bullock Electric Manufacturing Company.....	1,687.50
14. Llewellyn Iron Works.....	20,000.00

	125,132.50
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Total estimate.....	387,132.50
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San Carlos project.

Total expenditures to end of last quarter, December 31, 1905.....	\$21,738.95
Estimated expenditures during current quarter, March 31, 1906.....	952.71
Estimated expenditures for next quarter to June 30, 1906.....	300.00

Little Colorado project.

Total expenditures to end of last quarter, December 31, 1905.....	\$3,236.74
Estimated expenditures during current quarter, March 31, 1906.....	1,038.10
Estimated expenditures for next quarter to June 30, 1906.....	500.00

San Pedro project.

Total expenditures to end of last quarter, December 31, 1905.....	\$2,219.20
Estimated expenditures during current quarter, March 31, 1906.....	280.00
Estimated expenditures for next quarter to June 30, 1906.....	150.00

CALIFORNIA.

Yuma project.

Total expenditures to end of last quarter, December 31, 1905	\$353,360.45
Estimated expenditures during current quarter, March 31, 1906	195,373.76

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	22,000.00
2. Wages—foremen, mechanics, laborers, etc., and teams	50,000.00
3. Expenses for subsistence, forage, camp supplies, etc	20,000.00
4. Expendable supplies—fuel, explosives, etc	2,500.00
5. Materials—cement, lumber, steel, etc	15,000.00
6. Equipment—machinery, tools, wagons, animal, etc	19,500.00
7. Purchase of lands, rights of water, etc	36,000.00

Total engineering force account, administrative, etc	165,000.00
Contract for construction with—	
8. J. G. White & Co	\$133,000.00
9. Cement	3,000.00
10. Laguna sluice gates and regulators, to be let	25,000.00
	161,000.00

Total estimate	326,000.00
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Sacramento Valley project.

Total expenditures to end of last quarter, December 31, 1905	\$34,298.77
Estimated expenditures during current quarter, March 31, 1906	2,665.97

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc., including Los Angeles office	1,690.00
2. Wages—foremen, mechanics, laborers, etc	980.00
3. Expenses for subsistence, forage, camp supplies, etc	580.00
6. Equipment—machinery, tools, wagons, animals, etc	2,250.00

Total engineering force account, administrative, etc	5,500.00
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Owens Valley project.

Total expenditures to end of last quarter, December 31, 1905	\$24,767.05
Estimated expenditures during current quarter, March 31, 1906	542.98

San Joaquin project.

Total expenditures to end of last quarter, December 31, 1905	\$3,517.00
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COLORADO.

Uncompahgre Valley project.

Total expenditures to end of last quarter, December 31, 1905	\$709,349.00
Estimated expenditures during current quarter, March 31, 1906	333,782.56

Estimated expenditures for next quarter, to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	15,000.00
2. Wages—foremen, mechanics, laborers, etc	135,000.00
3. Expenses for subsistence, forage, camp supplies, etc	15,000.00
4. Expendable supplies, fuel, explosives, etc	15,000.00
5. Materials—cement, lumber, steel, trees, and piles, etc	50,000.00
6. Equipment—machinery, tools, wagons, animals, etc	25,000.00
7. Purchase of lands, rights of way, etc	5,000.00

Total engineering force account, administrative, etc	260,000.00
Contract for construction with—	
8. Orman & Crook	\$70,000
9. McPhee & McGinnity	30,000
	100,000.00

Total estimates	380,000.00
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Grand River project.

Total expenditures to end of last quarter, December 31, 1905.....	\$8,712.39
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White River project.

Total expenditures to end of last quarter, December 31, 1905.....	\$3,652.37
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Colorado River storage.

Total expenditures to end of last quarter, December 31, 1905.....	\$17,778.65
Estimated expenditures during current quarter, March 31, 1906.....	350.00
Estimated expenditures for next quarter to June 30, 1906	200.00

IDAHO.

Minidoka project.

Total expenditures to end of last quarter, December 31, 1905.....	\$509,639.23
Estimated expenditures during current quarter, March 31, 1906	272,060.77

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	13,000.00
2. Wages—foremen, mechanics, laborers, etc.....	25,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	10,100.00
4. Expendable supplies—fuel, explosives, etc.....	300.00
5. Materials—cement, lumber, steel, trees, and piles, etc.....	4,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	1,000.00
7. Purchase of lands, rights of way, etc.....	15,000.00

Total engineering force account, administrative, etc.....	68,400.00
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Contract for construction with—

8. Bates & Rogers.....	\$120,000.00
9. Portland Cement Company.....	19,000.00
10. Monarch & Porter.....	159,000.00
11. Orman & Crook.....	148,000.00
12. Hubbard & Carlson.....	60,000.00
13. Vulcan Iron Works.....	8,000.00
	514,000.00

Total estimate	582,400.00
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Payette-Boise project.

Total expenditures to end of last quarter, December 31, 1905.....	\$41,288.88
Estimated expenditures during current quarter, March 31, 1906	43,684.12

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	6,300.00
2. Wages—foremen, mechanics, laborers, etc.....	8,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	3,000.00
4. Expendable supplies, fuel, explosives, etc.....	1,500.00
5. Materials—cement, lumber, steel, trees, and piles, etc.....	7,500.00
6. Equipment—machinery, tools, wagons, animals, etc.....	75,000.00
7. Purchase of land, rights of way, etc.....	100,000.00

Total engineering force account, administrative, etc.....	201,300.00
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Contract for construction with—

8. Utah Fireproofing Company.....	\$26,000.00
9. Conway & Wilhite.....	25,000.00
10. Page & Brinton.....	10,000.00
11. Hubbard & Carlson.....	70,000.00
12. United Iron Works.....	2,000.00
13. New contracts.....	25,000.00
14. Cement.....	12,000.00
	170,000.00

Total estimates.....	371,300.00
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Dubois project.

Total expenditures to end of last quarter, December 31, 1905..... \$19,410.89

KANSAS.

Garden City project.

Total expenditures to end of last quarter, December 31, 1905..... \$12,817.00
 Estimated expenditures during current quarter, March 31, 1906..... 590.05

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	3,000.00
2. Wages—foremen, mechanics, laborers, etc.....	2,200.00
3. Expenses for subsistence, forage, camp supplies, etc.....	1,200.00
4. Expendable supplies, fuel, explosives, etc	1,800.00
5. Materials—cement, lumber, steel, etc	3,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	2,000.00
7. Purchase of lands, rights of way, etc	4,500.00

Total engineering force account, administrative, etc..... 17,700.00

MONTANA.

Huntley project.

Total expenditures to end of last quarter, December 31, 1905..... \$53,193.11
 Estimated expenditures during current quarter, March 31, 1906..... 29,824.97

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	11,000.00
2. Wages—foremen, mechanics, laborers, etc.....	2,000.00
3. Expenses for subsistences, forage, camp supplies, etc.....	5,000.00
4. Expendable supplies, fuel, explosives, etc	1,000.00
5. Materials—cement, lumber, steel, etc	3,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	1,000.00
7. Purchase of lands, rights of way, etc.....	9,000.00

Total engineering force account, administrative, etc..... 32,000.00

Contract for construction with—

8. W. D. Lovel	15,000.00
9. W. D. Lovel	25,000.00
10. Callahan, et al.....	25,000.00
11. The Piper Bros. Co	55,000.00
12. Illinois Steel Company.....	4,000.00
13. Hughes & Olson.....	30,000.00
14. New Jersey Foundry and Machine Company	5,000.00

Total estimate 159,000.00

Milk River project.

Total expenditures to end of last quarter, December 31, 1905..... \$138,871.27
 Estimated expenditures during current quarter, March 31, 1906..... 3,604.00

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	5,000.00
2. Wages—foremen, mechanics, laborers, etc.....	5,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	4,000.00
4. Expendable supplies, fuel, explosives, etc.....	1,000.00
5. Materials—cement, lumber, steel, etc	6,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	2,000.00

Total engineering force account, administrative..... 23,000.00

Sun River project.

Total expenditures to end of last quarter, December 31, 1905	\$49,540.86
Estimated expenditures during current quarter, March 31, 1906	2,834.02

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.	4,000.00
2. Wages—foremen, mechanics, laborers, etc.	3,000.00
3. Expenses for subsistence, forage, camp supplies, etc.	2,500.00
4. Expendable supplies, fuel, explosives, etc.	1,000.00
5. Materials—cement, lumber, steel, trees, and piles, etc.	2,000.00
6. Equipment—machinery, tools, wagons, animals, etc.	2,500.00

Total engineering force account, administrative	15,000.00
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Crow Reservation project.

Total expenditures to end of last quarter, December 31, 1905	\$21,080.38
Estimated expenditures during current quarter, March 31, 1906	266.66

Estimated expenditures for next quarter to June 30, 1906, for engineering and administrative expenses, subsistence, laborers on force account, traveling, equipment, supplies, rent, storage, forage, animals, harness, vehicles, etc.	3,000.00
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Madison River project.

Total expenditures to end of last quarter, December 31, 1905	\$8,142.57
Estimated expenditures during current quarter, March 31, 1906	1,936.34
Estimated expenditures for next quarter to June 30, 1906	1,000.00

Lake Basin project.

Total expenditures to end of last quarter, December 31, 1905	\$4,639.25
Estimated expenditures during current quarter, March 31, 1906	1,536.03
Estimated expenditures for next quarter to June 30, 1906	1,500.00

Clarke Fork project.

Total expenditures to end of last quarter, December 31, 1905	\$4,005.06
Estimated expenditures during current quarter, March 31, 1906	1,450.00
Estimated expenditures for next quarter to June 30, 1906	500.00

NEBRASKA.

North Platte project.

Total expenditures to end of last quarter, December 31, 1905	\$340,789.32
Estimated expenditures during current quarter, March 31, 1906	327,895.63

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.	28,000.00
2. Wages—foremen, mechanics, laborers, etc.	6,000.00
3. Expenses for subsistence—forage, camp supplies, etc.	11,500.00
4. Expendable supplies—fuel, explosives, etc.	2,500.00
5. Materials—cement, lumber, steel, etc.	35,000.00
6. Equipment—machinery, tools, wagons, animals, etc.	5,200.00
7. Purchase of lands, rights of way, etc.	168,000.00

Total engineering force account, administrative, etc.	256,200.00
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Contracts for construction with—

8. Deadwood Construction Company	\$12,000.00
9. Griffiths & McDermott	17,000.00
10. Orman & Crook	35,000.00
11. James O'Connor	12,000.00
12. Robinson & Maney	100,000.00
13. Burke Construction Company	30,000.00
14. Colorado Portland Cement Company	10,000.00

Estimated expenditures for next quarter to June 30, 1906—Continued.

Contracts for construction with—	
15. Deadwood Construction Company	\$150,000.00
16. W. O. Morrison	80,000.00
17. James O'Connor	30,000.00
18. Geddis & Seerie Stone Company	50,000.00
19. New contracts not awarded	20,000.00
	<hr/>
	\$546,000.00
Total estimate	<hr/>
	802,200.00

South Platte underflow reconnaissance.

Total expenditures to end of last quarter, December 31, 1905	\$2,478.92
Estimated expenditures during current quarter, March 31, 1906	295.00

NEVADA.

Truckee-Carson project.

Total expenditures to end of last quarter, December 31, 1905	\$2,711,582.44
Estimated expenditures during current quarter, March 31, 1906	119,585.90

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	33,000.00
2. Wages—foremen, mechanics, laborers, etc.....	45,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	45,000.00
4. Expendable supplies, fuel, explosives, etc.....	3,000.00
5. Materials—cement, lumber, steel, trees, and piles, etc.....	10,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	10,000.00
7. Purchase of lands, rights of way, etc.....	16,000.00
	<hr/>
Total engineering force account, administrative, etc.....	162,000.00
8. Contract for construction with.....	9,063.16
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Total estimates.....	171,063.16

Walker River project.

Total expenditures to end of last quarter, December 31, 1905.....	\$12,215.54
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NEW MEXICO.

Hondo project.

Total expenditures to end of last quarter, December 31, 1905.....	\$185,244.95
Estimated expenditures during current quarter, March 31, 1905.....	71,424.92

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	3,000.00
2. Wages—foremen, mechanics, laborers, etc.....	15,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	1,200.00
4. Expendable supplies, fuel, explosives, etc.....	2,500.00
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Total engineering force account, administrative.....	21,700.00
Contract with Wood, Bancroft & Doty.....	\$23,147.20
Contract with T. F. Cazier.....	7,330.00
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	30,477.20
Total estimates.....	<hr/>
	52,177.20

Rio Grande project.

Total expenditures to end of last quarter, December 31, 1905.....	\$48,240.61
Estimated expenditures during current quarter, March 31, 1906.....	3,000.00

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspector, clerks, etc.....	\$4, 500. 00
2. Wages—foremen, mechanics, laborers, etc.....	16, 500. 00
3. Expenses for subsistence, forage, camp supplies, etc.....	5, 000. 00
4. Expendable supplies, fuel, explosives, etc.....	2, 000. 00
5. Materials—cement, lumber, steel, trees, and piles, etc.....	20, 000. 00
6. Equipment—machinery, tools, wagons, animals, etc.....	2, 000. 00

Total engineering force account, administrative.....	50, 000. 00
Leasburg dam, etc. (not let), estimated expenditure to June 30, 1906.....	10, 000. 00

Total estimate.....	60, 000. 00
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Urton Lake project.

Total expenditures to end of last quarter, December 31, 1905.....	\$17, 559. 15
Estimated expenditures during current quarter, March 31, 1906.....	227. 55

Estimated expenditures for next quarter, to June 30, 1906:

Service—engineers, experts, inspectors, clerks, etc.....	450. 00
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Total engineering force account, administrative, etc.....	450. 00
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Las Vegas project.

Total expenditures to end of last quarter, December 31, 1905.....	\$4, 093. 55
Estimated expenditures during current quarter, March 31, 1906.....	300. 00

Service—engineers, experts, inspectors, clerks, etc.....	500. 00
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Total engineering force account, administrative, etc.....	500. 00
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Carlsbad project.

Total expenditures to end of last quarter, December 31, 1905.....	\$23, 053. 33
Estimated expenditures during current quarter, March 31, 1906.....	163, 171. 88

Estimated expenditures for next quarter, to June 30, 1906:

1. Service—engineers, experts, inspectors, clerks, etc.....	5, 000. 00
2. Wages—foremen, mechanics, laborers, etc.....	30, 000. 00
3. Expenses for subsistence, forage, camp supplies, etc.....	8, 000. 00
4. Expendable supplies—fuel, explosives, etc.....	12, 000. 00
5. Materials—cement, lumber, steel, trees, piles.....	20, 000. 00
6. Equipment—machinery, tools, wagons, animals, etc.....	20, 000. 00

Total engineering force account, administrative.....	95, 000. 00
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Contract for construction of Avalon dam (to be let).....	75, 000. 00
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Contract for construction of well at Avalon.....	900. 00
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Total estimate.....	170, 900. 00
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La Plata project.

Total expenditures to end of last quarter, December 31, 1905.....	\$29, 338. 15
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NORTH DAKOTA-MONTANA.

Lower Yellowstone project.

Total expenditures to end of last quarter, December 31, 1905.....	\$173, 030. 70
Estimated expenditures during current quarter, March 31, 1906.....	29, 631. 30

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	18, 000. 00
2. Wages—foremen, mechanics, laborers, etc.....	62, 500. 00
3. Expenses for subsistence, forage, camp supplies, etc.....	18, 000. 00
4. Expendable supplies, fuel, explosives, etc.....	11, 000. 00

Estimated expenditures for next quarter to June 30, 1906—Continued.

5. Materials—cement, lumber, steel, trees, and piles, etc.....	\$28,000.00
6. Equipment—machinery, tools, wagons, animals, etc.....	14,000.00
7. Purchase of lands, rights of way, etc.....	3,000.00
Total engineering force account, administrative.....	155,400.00
Contract for construction with—	
8. Widell-F. Company.....	\$50,000.00
9. Divisions 2, 3, and 4, Schedule A.....	15,000.00
10. Stabern.....	40,000.00
11. Deadwood Construction Company.....	25,000.00
12. Nohle & Mann.....	3,000.00
13. Illinois Steel Company.....	7,500.00
14. Steel.....	3,000.00
15. Structures.....	10,000.00
	153,500.00
Total.....	308,900.00

NORTH DAKOTA.

Ruford-Trenton, Williston, Nesson projects.

Total expenditures to end of last quarter, December 31, 1905.....	\$58,430.68
Estimated expenditures during current quarter, March 31, 1906.....	4,605.82

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	5,500.00
2. Wages—foremen, mechanics, laborers, etc.....	3,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	2,000.00
4. Expendable supplies, fuel, explosives, etc.....	1,000.00
5. Materials—cement, lumber, steel, trees, piles, etc.....	2,000.00
6. Equipment—machinery, tools, wagons, animal, etc.....	1,500.00
7. Purchase of lands, rights of way, etc.....	1,000.00
Total engineering force account, administrative, etc.....	16,000.00
Estimate of total expenditures on prospective contracts.....	10,000.00
Total estimate.....	26,000.00

Bismarck project.

Total expenditures to end of last quarter, December 31, 1905.....	\$16,352.19
Estimated expenditures during current quarter, March 31, 1906.....	174.16
Estimated expenditures for next quarter to June 30, 1906.....	500.00

Little Missouri project.

Total expenditures to end of last quarter, December 31, 1905.....	\$5,872.05
Estimated expenditures for next quarter to June 30, 1906.....	100.00

OKLAHOMA.

Red River project.

Total expenditures to end of last quarter, December 31, 1905.....	\$31,661.27
Estimated expenditures during current quarter, March 31, 1906.....	8,597.11

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc.....	4,000.00
2. Wages—foremen, mechanics, laborers, etc.....	2,000.00
3. Expenses for subsistence, forage, camp supplies, etc.....	1,000.00
5. Materials—cement, lumber, steel, trees, and piles, etc., purchase and installation of pumping plant and construction for testing the use of the waters of Red River for irrigation purposes.....	4,000.00
Total engineering, force account, administration.....	11,000.00

OREGON-CALIFORNIA.

Klamath project.

Total expenditures to end of last quarter, December 31, 1905.....	\$82, 228. 65
Estimated expenditures during current quarter, March 31, 1906	8, 545. 96
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, inspectors, clerks, etc	16, 000. 00
2. Wages—foremen, mechanics, laborers, etc	15, 000. 00
3. Expenses for subsistence, forage, camp supplies, etc	8, 000. 00
4. Expendable supplies—fuel, explosives, etc	2, 000. 00
5. Materials—cement, lumber, steel, etc	8, 500. 00
6. Equipment—machinery, tools, wagons, animals, etc	17, 500. 00
7. Purchase of lands, rights of way, etc., contracts approved	500, 000. 00
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Total engineering, force account, administrative, etc.....	567, 000. 00
8. Contract for construction with Mason, Davis Company.....	75, 000. 00
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Total estimate	642, 000. 00

Umatilla project.

Total expenditures to end of last quarter, December 31, 1905.....	\$33, 393. 59
Estimated expenditures during current quarter, March 31, 1906.....	7, 422. 37
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, clerks, etc	10, 000. 00
2. Wages—foremen, mechanics, laborers, etc	6, 000. 00
3. Expenses for subsistence, forage, camp supplies, etc	4, 000. 00
4. Expendable supplies—fuel, explosives, etc	1, 500. 00
5. Material—cement, lumber, steel, etc	10, 000. 00
6. Equipment—machinery, tools, wagons, animals, etc	2, 500. 00
7. Purchase of lands, rights of way, etc	50, 000. 00
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Total engineering force account, administrative, etc.....	84, 000. 00
8. Contracts for construction	40, 000. 00
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	124, 000. 00

Malheur project.

Total expenditures to end of last quarter, December 31, 1905.....	\$69, 295. 14
Estimated expenditures during current quarter, March 31, 1906.....	1, 591. 37
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, clerks, etc	1, 000. 00
2. Wages—foremen, laborers, etc	2, 500. 00
3. Expenses for subsistence, forage, travel, etc	2, 500. 00
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Total	6, 000. 00

Central Oregon reconnaissance.

Total expenditures to end of last quarter ended December 31, 1905....	\$22, 120. 18
Estimated expenditures during current quarter, March 31, 1906	538. 97
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, clerks, etc	2, 000. 00
2. Wages—foremen, laborers, etc	
3. Expenses for subsistence, forage, travel, etc	1, 000. 00
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Total	3, 000. 00

SOUTH DAKOTA.

Belle Fourche project.

Total expenditures to end of last quarter December 31, 1905	\$196,507.91
Estimated expenditures during current quarter, March 31, 1906	71,895.14
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, inspectors, clerks, etc	10,000.00
2. Wages—foremen, mechanics, laborers, etc	32,500.00
3. Expenses for subsistence, forage, camp supplies, etc	8,500.00
4. Expendable supplies—fuel, explosives, etc	5,500.00
5. Materials—cement, lumber, steel, etc	5,500.00
6. Equipment—machinery, tools, wagons, animal, etc	11,000.00
7. Purchase of lands, rights of way, etc	15,000.00
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Total engineering force account, administrative, etc	88,000.00
Contract for construction with—	
8. Robinson	\$50,000.00
9. Orman & Crook	100,000.00
10. Western Portland Cement Company	15,000.00
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	165,000.00
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Total estimate	253,000.00

UTAH.

Strawberry Valley project.

Total expenditures to end of last quarter, December 31, 1905	\$37,549.89
Estimated expenditures during current quarter, March 31, 1906	8,626.84
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, inspectors, clerks, etc	7,000.00
2. Wages—foremen, mechanics, laborers, etc	10,000.00
3. Expenses for subsistence, forage, camp supplies, etc	5,000.00
4. Expendable supplies, fuel, explosives, etc	1,000.00
5. Materials—cement, lumber, steel, trees, and piles, etc	12,000.00
6. Equipment—machinery, tools, wagons, animals, etc	4,000.00
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Total engineering, force account, administrative, etc	39,000.00
Telephone line contract pending (estimated)	10,000.00
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Total estimate	49,000.00

Utah Lake project.

Total expenditures to end of last quarter, December 31, 1905	\$34,044.67
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Bear Lake project.

Total expenditures to end of last quarter, December 31, 1905	\$18,670.25
Estimated expenditures during current quarter, March 31, 1906	150.00

WASHINGTON.

Okanogan project.

Total expenditures to end of last quarter, December 31, 1905	\$26,245.40
Estimated expenditures during current quarter, March 31, 1906	1,765.60
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Estimated expenditures for next quarter to June 30, 1906:	
1. Services—engineers, experts, clerks, etc	4,000.00
2. Wages—foremen, mechanics, laborers, etc	2,000.00
3. Expenses for subsistence, forage, camp supplies, etc	4,500.00
4. Expendable supplies, fuel, explosives, etc	500.00
5. Materials—cement, lumber, steel, etc	1,500.00
6. Equipment—machinery, tools, wagons, animals, etc	1,000.00
7. Purchase of lands, rights of way, etc	30,000.00
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Total engineering, force account, administrative, etc	43,500.00

RECLAMATION WORK OF THE GOVERNMENT.

Yakima project.

Total expenditures to end of last quarter, December 31, 1905	\$40,250.36
Estimated expenditures during current quarter, March 31, 1906	12,536.64

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	19,000.00
2. Wages—foremen, mechanics, laborers, etc	1,600.00
3. Expenses for subsistence, forage, camp supplies, etc	6,200.00
4. Expendable supplies, fuel, explosives, etc	400.00
6. Equipment—machinery, tools, wagons, animals, etc	2,100.00
7. Purchase of lands, rights of way, etc	295,000.00

Total engineering force account, administrative, etc	324,300.00
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Palouse project.

Total expenditures to end of last quarter, December 31, 1905	\$75,718.81
Estimated expenditures during current quarter, March 31, 1906	450.00

Estimated expenditures for next quarter to June 30, 1906:

Services—engineers, experts, inspectors, clerks, etc	2,000.00
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Priest Rapids project.

Total expenditures to end of last quarter, December 31, 1905	\$3,387.45
Estimated expenditures during current quarter, March 31, 1906	2,509.55

Estimated expenditures for next quarter to June 30, 1906:

Services—engineers, experts, inspectors, clerks, etc	7,500.00
Expenses for subsistence, forage, camp supplies, etc	1,500.00

Total engineering force account, administrative, etc	9,000.00
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WYOMING.

Shoshone project.

Total expenditures to end of last quarter, December 31, 1905	\$183,188.20
Estimated expenditures during current quarter, March 31, 1906	109,346.80

Estimated expenditures for next quarter to June 30, 1906:

1. Services—engineers, experts, inspectors, clerks, etc	12,000.00
2. Wages—foremen, mechanics, laborers, etc	4,000.00
3. Expenses for subsistence, forage, camp supplies, etc	3,500.00
4. Expendable supplies, fuel, explosives, etc	500.00
5. Materials—cement, lumber, steel, trees, and piles, etc	50,000.00
6. Equipment—machinery, tools, wagons, animals, etc	2,000.00
7. Purchase of lands, rights of way, etc	80,000.00

Total engineering force account, administrative, etc	152,000.00
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8. Contract for construction with Prendergast & Clarkson	30,000.00
9. Contract for construction with Charles Spear	40,000.00

Total estimate	222,000.00
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De Smet project.

Total expenditures to end of last quarter, December 31, 1905	\$8,904.52
Estimated expenditures during current quarter, March 31, 1906	200.00

Estimated expenditures for next quarter to June 30, 1906:

Services—engineers, experts, clerks, etc	500.00
Traveling, subsistence, supplies, etc	200.00

Total for the quarter	700.00
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GENERAL ADMINISTRATION.

Expenditures July 9, 1902, to March 31, 1905, prorated to projects.	
Expenditures April 1, 1905, to December 31, 1905.....	\$160,044.85
Estimated expenditures current quarter to March 31, 1906	55,235.00
Total to March 31, 1906 (will be prorated to projects).	

Estimated expenditures next quarter to June 30, 1906:	
1. Services—engineers, clerks, etc. (administration)	28,485.00
2. Services—draftsmen, photographers, etc. (design)	3,720.00
3. Expenses for travel, rent, light, freight, etc	8,800.00
4. Expendable supplies for office and field use	8,000.00
5. Expendable supplies, stationery, printing, books of reference.	6,300.00
6. Equipment, instruments, furniture, etc.....	4,000.00
Total estimate.....	59,305.00

EXPERT ENGINEERING.

Expenditures July 9, 1902, to December 31, 1905, prorated to projects.	
Estimated expenditures current quarter to March 31, 1906	\$21,710.00
Estimated expenditures next quarter to June 30, 1906:	
1. Services—consulting engineer, experts, assistants, etc.....	14,115.00
2. Expenses for travel, rent, freight, etc	4,250.00
3. Expendable supplies	1,100.00
4. Equipment, experimental apparatus, etc	1,000.00
Total estimate	20,465.00

Receipts and expenditures, reclamation fund, past and prospective.

[Fiscal years.]

Actual receipts:		
1901.....	\$3,144,821.91	
1902.....	4,585,520.53	
1903.....	8,713,996.60	
Actual expenditures, 1903.....		\$286,440.21
Actual receipts, 1904.....	6,826,253.59	
Actual expenditures, 1904.....		1,461,305.01
Actual receipts, 1905.....	4,805,515.39	
Actual expenditures, 1905.....		3,714,523.64
Estimated receipts, 1906.....	^a 3,250,000.00	
Actual expenditures:		
First quarter.....	\$1,419,605.67	11,467,484.29
Second quarter.....	1,801,379.89	
Estimated expenditures:		
Third quarter.....	2,316,094.87	
Fourth quarter.....	5,930,403.86	
Estimated receipts, 1907.....	^a 3,000,000.00	
Estimated expenditures, 1907.....		13,000,000.00
Estimated receipts, 1908.....	^a 2,750,000.00	
Estimated expenditures, 1908		6,489,407.85
Estimated balance unallotted June 30, 1908		656,947.02
	37,076,108.02	37,076,108.02

^a From estimates of the General Land Office.

Financial statement showing the present and prospective expenditures, by projects, taken from the sixteenth quarterly estimate.

PRIMARY PROJECTS.

Project.	Allotment authorized.	Total estimated expenditures quarter ending Mar. 31, 1906.		
		Expenditures last quarter to Dec. 31, 1905.	Estimated expenditures current quarter to Mar. 31, 1906.	Estimated available balance Apr. 1, 1906.
Arizona: Salt River.....	\$4,539,161.00	\$1,986,561.68	\$392,088.32	\$2,160,511.00
California: Yuma, California-Arizona.....	3,000,000.00	353,360.46	195,873.76	2,451,265.79
Colorado: Uncompahgre.....	2,500,000.00	709,349.00	333,782.66	1,456,868.44
Idaho:				
Minidoka.....	1,300,000.00	509,639.23	272,060.77	518,300.00
Payette-Boise.....	1,300,000.00	41,228.88	43,684.12	1,215,087.00
Kansas: Garden City.....	260,000.00	12,817.95	590.05	246,592.00
Montana:				
Huntley.....	900,000.00	53,193.11	29,824.97	816,981.92
Milk River (St. Mary, sub., Marias, sub.).....	1,000,000.00	138,871.27	3,604.00	857,524.73
Sun River.....	500,000.00	49,540.86	2,834.02	447,625.12
Nebraska: North Platte, Nebraska-Wyoming.....	3,330,000.00	340,789.32	327,895.63	2,661,315.05
Nevada: Truckee-Carson.....	3,000,000.00	2,711,682.44	119,685.90	168,831.66
New Mexico:				
Hondo.....	240,000.00	185,244.95	71,424.92	16,669.87
Rio Grande.....	200,000.00	48,240.61	8,000.00	148,759.39
Carlsbad.....	600,000.00	23,053.33	163,171.88	413,774.79
North Dakota:				
Lower Yellowstone, North Dakota-Montana.....	1,900,000.00	173,030.70	29,631.30	1,697,338.00
Burford-Trenton.....	1,000,000.00	58,430.68	4,605.82	936,963.50
Oregon:				
Klamath, Oregon-California.....	2,000,000.00	82,228.65	8,545.96	1,909,225.39
Umatilla.....	1,000,000.00	33,393.59	7,422.37	959,184.04
South Dakota: Bellefourche.....	2,100,000.00	196,507.91	71,696.14	1,831,796.95
Utah: Strawberry Valley.....	1,250,000.00	87,549.89	8,626.84	1,203,823.27
Washington:				
Okanogan.....	500,000.00	26,245.40	1,765.60	471,989.00
Yakima.....	1,750,000.00	40,250.36	12,586.64	1,697,213.00
Wyoming: Shoshone.....	2,250,000.00	183,188.20	109,346.80	1,957,465.00
Washington office:				
General administration.....	215,279.85	160,044.85	55,235.00	.....
Expert engineering.....	21,710.00	.....	21,710.00	.....
Total.....	36,656,150.85	8,154,343.31	2,290,042.37	26,211,765.17

Project.	Estimated available balance, divided as follows:		Next quarter ending June 30, 1906.	
	Liabilities on contracts.	New contracts, engineering, and miscellaneous.	Pending contracts.	New contracts, engineering, and miscellaneous.
Arizona: Salt River.....	\$1,373,660.24	\$786,850.76	\$125,132.50	\$476,161.00
California: Yuma, California-Arizona.....	692,306.72	1,758,959.07	134,000.00	190,000.00
Colorado: Uncompahgre.....	480,954.63	975,913.81	100,000.00	260,000.00
Idaho:				
Minidoka.....	494,676.00	23,624.00	494,676.00	68,400.00
Payette-Boise.....	539,800.00	675,287.00	133,000.00	238,300.00
Kansas: Garden City.....	.....	246,592.00	.....	17,700.00
Montana:				
Huntley.....	508,509.75	308,472.17	127,000.00	32,000.00
Milk River (St. Mary, sub., Marias, sub.).....	.....	857,524.73	.....	23,000.00
Sun River.....	.....	447,625.12	.....	15,000.00
Nebraska: North Platte, Nebraska-Wyoming.....	1,220,659.69	1,440,655.36	526,000.00	276,200.00
Nevada: Truckee-Carson.....	9,063.16	159,768.50	9,063.16	159,768.50
New Mexico:				
Hondo.....	.....	18,830.13	30,477.13	21,700.00
Rio Grande.....	.....	148,759.39	.....	60,000.00
Carlsbad.....	21,500.00	392,274.79	21,500.00	149,400.00
North Dakota:				
Lower Yellowstone, North Dakota-Montana.....	542,609.61	1,154,728.39	220,500.00	155,400.00
Burford-Trenton.....	.....	936,963.50	.....	26,000.00
Oregon:				
Klamath, Oregon-California.....	384,158.00	1,525,067.39	75,000.00	567,000.00
Umatilla.....	.....	959,184.04	.....	124,000.00
South Dakota: Bellefourche.....	1,155,054.53	676,742.42	165,000.00	88,000.00
Utah: Strawberry Valley.....	.....	1,203,823.27	.....	49,000.00

Financial statement showing the present and prospective expenditures, by projects, taken from the sixteenth quarterly estimate—Continued.

PRIMARY PROJECTS—Continued.

Project.	Estimated available balance, divided as follows:		Next quarter ending June 30, 1906.	
	Liabilities on contracts.	New contracts, engineering, and miscellaneous.	Pending contracts.	New contracts, engineering, and miscellaneous.
Washington:				
Okanogan		\$471,989.00		\$43,500.00
Yakima		1,697,213.00		324,300.00
Wyoming: Shoshone	\$1,061,267.00	896,198.00	\$70,000.00	152,000.00
Washington office:				
General administration				59,305.00
Expert engineering				20,465.00
Total	8,484,219.83	17,744,215.71	2,233,348.79	3,596,599.50

Project.	Fiscal year ending June 30, 1907.		Fiscal year ending June 30, 1908.	
	Pending contracts.	New contracts, engineering and miscellaneous.	Pending contracts.	New contracts, engineering and miscellaneous.
Arizona: Salt River	\$700,000.00	\$250,000.00	\$548,527.74	\$60,689.76
California: Yuma, California-Arizona	556,306.72	882,000.00		686,959.07
Colorado: Uncompahgre	380,954.63	640,000.00		75,913.81
Idaho:				
Minidoka		120,000.00		34,324.00
Payette-Boise	250,000.00	365,000.00	156,800.00	153,000.00
Kansas: Garden City		214,000.00		14,892.00
Montana:				
Huntley	280,000.00	227,000.00	101,509.75	49,472.17
Milk River (St. Mary, sub., Marias, sub.)		525,000.00		309,524.73
Sun River		250,000.00		182,625.12
Nebraska: North Platte, Nebraska-Wyoming	445,000.00	770,000.00	249,659.69	394,456.36
Nevada: Truckee-Carson		500,000.00		52,231.00
New Mexico:				
Rio Grande		88,759.39		
Carlsbad		242,874.79		
North Dakota:				
Lower Yellowstone, North Dakota-Montana	322,109.61	340,400.00	369,499.00	289,429.39
Burford-Trenton		560,000.00		350,963.50
Oregon:				
Klamath, Oregon-California	309,158.00	568,315.00		389,752.39
Umatilla		660,000.00		175,184.04
South Dakota: Bellefourche	600,000.00	485,000.00	390,064.53	103,742.42
Utah: Strawberry Valley		380,000.00		774,823.27
Washington:				
Okanogan		36,500.00		391,989.00
Yakima		1,022,500.00		350,413.00
Wyoming: Shoshone	770,766.00	566,689.00	220,501.00	177,509.00
Total	4,614,294.96	9,694,038.18	2,086,561.71	5,017,893.03

Recapitulation of expenditures on secondary projects.

State.	Project.	Expended to Dec. 31, 1905.	Estimated to Mar. 31, 1906.	Estimated to June 30, 1906.
Arizona	San Carlos	\$21,738.96	\$952.71	\$300.00
Do	San Pedro	2,219.20	280.00	150.00
Do	Little Colorado	3,236.74	1,089.10	500.00
California	Sacramento Valley	34,298.77	2,665.97	5,500.00
Do	Owens Valley	24,767.05	542.98	
Do	San Joaquin	3,517.39		
Colorado	Grand River	8,712.39		
Do	White River	3,652.37		
Do	Colorado River storage	17,778.65	350.00	200.00
Idaho	Dubois	19,410.89		

Recapitulation of expenditures on secondary projects—Continued.

State.	Project.	Expended to Dec. 31, 1906.	Estimated to Mar. 31, 1906.	Estimated to June 30, 1906.
Montana	Crow Reservation	\$21,080.88	\$266.66	\$3,000.00
Do	Madison River	8,142.57	1,936.34	1,000.00
Do	Lake Basin	4,639.25	1,586.03	1,500.00
Do	Clarke Fork	4,005.06	1,450.00	500.00
Nebraska	South Platte	2,478.92	296.00	.....
Nevada	Walker River	12,215.64	.....	.....
New Mexico	Urton Lake	17,559.15	227.55	450.00
Do	Las Vegas	4,093.55	300.00	500.00
Do	La Plata	29,338.15	.....	.....
North Dakota	Bismarck	16,352.19	174.16	500.00
Do	Little Missouri	5,872.06	.....	100.00
Oklahoma	Red River	31,661.27	8,597.11	11,000.00
Oregon	Malheur	69,296.14	1,591.37	6,000.00
Do	Central Oregon	22,120.18	538.97	3,000.00
Utah	Utah Lake	34,044.67	.....	.....
Do	Bear Lake	18,670.25	150.00	.....
Washington	Palouse	75,718.81	450.00	2,000.00
Do	Priest Rapids	3,387.45	2,509.55	9,000.00
Wyoming	De Smet	8,904.52	200.00	700.00
Total .....	.....	528,911.11	26,052.50	45,900.00

Organization of the reclamation service, April 1, 1906.

Name.	Position.	Where employed.	Salary.
C. E. Grunsky	Consulting engineer	Washington and in field ..	\$10,000.00
F. H. Newell	Chief engineer	do	5,000.00
A. P. Davis	Assistant chief engineer	do	4,500.00
W. H. Sanders	Consulting engineer	In the field	4,200.00
A. J. Wiley	do	do	4,200.00
O. H. Ensign	do	do	4,200.00
Geo. Y. Wigner	do	do	a 30.00
ARIZONA.			
L. C. Hill	Supervising engineer	Roosevelt, Ariz	4,000.00
Chester W. Smith	Constructing engineer	do	3,000.00
E. Duryee	Cement expert	do	3,000.00
B. R. Harrison	Tunnel expert	do	b 150.00
F. Telchman	Designing engineer	do	2,400.00
W. A. Farish	Engineer	do	1,800.00
J. D. Stannard	Assistant engineer	do	1,800.00
A. L. Harris	do	do	1,600.00
O. T. Reedy	do	do	1,400.00
Hugh Redmond	do	do	1,200.00
H. S. Reed	do	do	1,400.00
O. L. McIntyre	do	do	1,400.00
A. H. Demrick	Electrician	do	b 150.00
W. A. Perkins	Engineering aid	do	1,200.00
Carl R. Weltze	do	do	900.00
CALIFORNIA.			
J. B. Lippincott	Supervising engineer	Los Angeles, Cal.	4,200.00
S. G. Bennett	Assistant supervising engineer ..	do	2,200.00
Homer Hamlin	Engineer in charge Yuma project ..	Yuma, Ariz	3,000.00
L. M. Lawson	Engineer	do	1,400.00
R. G. Doerfling	do	do	2,200.00
E. D. Vincent	do	do	2,100.00
J. C. Avakian	Assistant engineer	do	1,500.00
L. B. Brainard	do	do	1,200.00
A. C. Hansen	do	do	1,400.00
O. W. Peterson	do	do	1,200.00
Weston Small	do	do	1,500.00
W. D. Smith	Engineering aid	do	1,000.00
A. J. Fisk	Topographic draftsman	do	1,200.00
D. W. Murphy	Engineer in charge Klamath project ..	Klamath Falls, Oreg	1,800.00
T. H. Humpherys	Engineer	do	1,800.00
William Sargent	do	do	2,000.00
J. C. Clausen	do	do	2,000.00
D. L. Reaburn	Topographer	do	1,800.00

a Per day.

b Per month.

Organization of the reclamation service, April 1, 1906—Continued.

Name.	Position.	Where employed.	Salary.
I. S. Voorhees	Assistant engineer	Klamath Falls, Oreg	\$1,400.00
R. D. Hubbard	do	do	1,200.00
W. A. Winn	do	do	1,400.00
E. H. Peery	Law clerk	do	2,000.00
J. G. Little	Structural draftsman	do	1,600.00
C. T. Darley	Hydrographer	do	1,000.00
Fred P. Beach	Mechanical engineer	Los Angeles, Cal	1,600.00
COLORADO.			
J. H. Quinton	Supervising engineer	Montrose, Colo	4,200.00
I. W. McConnell	Engineer in charge of Un- compahgre Valley project.	do	3,600.00
C. T. Pease	Engineer	do	1,600.00
E. E. Sands	do	do	1,800.00
J. L. Lytel	do	do	1,800.00
Oro McDermith	Assistant engineer	do	1,600.00
H. A. Howe	do	do	1,600.00
J. M. Roberts	do	do	1,200.00
J. H. Miner	do	do	1,600.00
IDAHO.			
D. W. Ross	Supervising engineer	Boise, Idaho	3,600.00
F. C. Horn	Constructing engineer	Minidoka, Idaho	3,000.00
D. G. Martin	do	do	2,200.00
Edward Hedden	do	do	a 183.33
J. L. Savage	Office engineer	Boise, Idaho	1,800.00
C. B. Smith	Engineer	do	1,800.00
J. T. Burke	do	do	1,800.00
G. H. Hogue	Assistant engineer	do	1,600.00
J. B. Bond	do	do	1,200.00
L. L. Gay	do	do	1,200.00
H. M. Hedges	do	do	b 4.00
A. M. Gilbert	do	do	1,200.00
W. R. Ewing	do	do	1,200.00
R. M. Conner	do	do	1,200.00
H. S. Williams	do	do	1,200.00
C. C. Fisher	do	do	1,200.00
R. J. Newell	do	do	1,200.00
C. M. King	do	do	1,200.00
Alfred B. Mayhew	Engineering aid	do	900.00
Roy Bullen	do	do	900.00
Henry L. Lyman	do	do	1,000.00
KANSAS.			
C. S. Slichter	Consulting engineer Garden City project.	Madison, Wis.	b 9.00
Charles E. Gordon	Engineer in charge Garden City project.	Garden City, Kans	1,800.00
L. E. Johnson	Engineering aid	do	1,000.00
L. F. Harza	do	do	900.00
MONTANA.			
H. N. Savage	Supervising engineer	Billings, Mont.	4,200.00
C. C. Babb	Engineer in charge Milk River project.	Chinook, Mont.	2,400.00
C. T. Prall	Assistant engineer	do	1,600.00
L. R. Stockman	do	do	1,600.00
W. S. Hanna	do	do	1,200.00
W. B. Freeman	Engineering aid	do	1,000.00
F. E. Weymouth	Engineer in charge Lower Yellowstone project.	Glendive, Mont.	2,700.00
C. H. Paul	Constructing engineer	do	2,400.00
E. C. Bebb	Engineer	do	1,800.00
G. H. Bliss	do	do	1,800.00
J. S. Conway	do	do	a 150.00
J. N. Kerr	Assistant engineer	do	1,600.00
H. S. Morse	do	do	900.00
C. W. Bowles	Engineering aid	do	900.00
G. R. Colson	do	do	720.00
H. N. Cross	do	do	900.00
F. T. Crowe	do	do	900.00
A. J. Hayes	do	do	900.00
M. W. Wolf	do	do	900.00
F. W. Talbot	do	do	900.00
A. J. Strong	Field assistant	do	a 60.00
R. H. Fifield	do	do	a 50.00
H. F. Burkart	do	do	a 115.00
L. H. Mitchell	do	do	a 50.00

a Per month.

b Per day.

Organization of the reclamation service, April 1, 1906—Continued.

Name.	Position.	Where employed.	Salary.
S. B. Robbins.....	Engineer in charge of Sun River project.	Great Falls, Mont.....	\$2,200.00
H. R. Evans.....	Assistant engineer.....	do.....	1,600.00
Gordon Edson.....	Engineering aid.....	do.....	1,000.00
R. S. Stockton.....	Engineer in charge of Huntley project.	Huntley, Mont.....	2,200.00
G. E. Goodwin.....	Engineer.....	do.....	1,800.00
H. A. Young.....	do.....	do.....	a 150.00
L. M. Hatch.....	Assistant engineer.....	do.....	1,400.00
R. O. Hoyt.....	do.....	do.....	a 100.00
E. C. Gersbach.....	do.....	do.....	1,200.00
A. L. Coupe.....	Engineering aid.....	do.....	1,000.00
J. C. Cleghorn.....	do.....	do.....	900.00
J. E. Shoemaker.....	do.....	do.....	1,000.00
F. E. Vey.....	do.....	do.....	900.00
L. R. Balch.....	do.....	do.....	1,000.00
J. H. Sloan.....	do.....	do.....	900.00
J. I. Bingham.....	do.....	do.....	900.00
A. M. Bouillon.....	Field assistant.....	do.....	1,600.00
C. D. Howe.....	Assistant engineer.....	do.....	1,200.00
J. A. French.....	Engineer, in charge of Clarks Fork investigation.	Billings, Mont.....	1,800.00
G. G. Stroebe.....	Engineering aid.....	do.....	1,000.00
G. E. Stratton.....	Assistant engineer, in charge of Lake Basin and Madison River investigations.	do.....	1,600.00
E. D. Hendricks.....	Assistant engineer.....	do.....	1,400.00
W. P. Hardesty.....	do.....	do.....	1,600.00
C. E. Shipman.....	Engineering aid.....	do.....	900.00
J. S. Swan.....	do.....	do.....	1,000.00
F. E. Ayer.....	Field assistant.....	do.....	a 116.66
NEBRASKA.			
Chas. E. Wells.....	Supervising engineer.....	Casper, Wyo.....	4,000.00
W. S. Coulter.....	Assistant engineer.....	do.....	1,600.00
John E. Field.....	District engineer.....	Wyncote, Wyo.....	2,700.00
Andrew Weiss.....	Engineer, in charge of construction North Platte project (first contract).	do.....	2,200.00
B. E. Forbes.....	Assistant engineer.....	do.....	1,800.00
P. D. Simpson.....	do.....	do.....	1,400.00
E. C. Woodward.....	do.....	do.....	1,600.00
Lothrob Crosby.....	Engineer.....	do.....	1,200.00
E. L. Shinbur.....	Engineer, in charge of construction North Platte project (second contract).	do.....	2,000.00
R. S. Carberry.....	Assistant engineer.....	do.....	1,600.00
J. C. Fitterer.....	do.....	do.....	a 100.00
B. E. Hayden.....	do.....	do.....	1,400.00
W. L. Gorton.....	Engineering aid, North Platte project.	do.....	1,000.00
F. D. Pyle.....	Engineering aid.....	do.....	1,000.00
Paul Rothi.....	do.....	do.....	1,000.00
A. B. Dodd.....	Assistant engineer, in charge surveys lateral system.	do.....	1,800.00
A. E. Woodward.....	Engineering aid.....	do.....	900.00
H. C. Wolff.....	Field assistant.....	do.....	b 4.00
NEVADA.			
L. H. Taylor.....	Supervising engineer, Truckee-Carson project.	Hazen, Nev.....	3,600.00
R. R. McGregor.....	Engineer, chief assistant.....	do.....	2,000.00
A. V. Saph.....	Engineer.....	do.....	1,800.00
E. L. Edes.....	Engineering aid.....	do.....	900.00
A. C. Redman.....	Assistant engineer.....	do.....	1,400.00
I. W. Huffaker.....	do.....	do.....	1,400.00
C. V. Taylor.....	do.....	do.....	1,600.00
B. E. Corlett.....	Engineering aid.....	do.....	1,000.00
H. L. Bellam.....	Field assistant.....	do.....	1,200.00
D. W. Hays.....	Assistant engineer.....	do.....	1,600.00
T. F. Eastman.....	do.....	do.....	1,200.00
W. N. Frickstad.....	do.....	do.....	1,200.00
A. H. Schadler.....	Engineering aid.....	do.....	1,000.00
Seymour Case.....	Assistant engineer.....	do.....	1,200.00
C. D. Atterbury.....	Engineering aid.....	do.....	900.00
W. D. Harrington.....	do.....	do.....	900.00
W. A. Keddie.....	Assistant engineer.....	do.....	1,600.00
Thomas Williamson.....	do.....	do.....	1,200.00
Thos. H. Means.....	Engineer of soils.....	do.....	2,700.00
R. W. Hawley.....	Assistant engineer.....	do.....	1,600.00

a Per month.

b Per day.

Organization of the reclamation service, April 1, 1906—Continued.

Name.	Position.	Where employed.	Salary.
NEW MEXICO.			
B. M. Hall	Supervising engineer.....	Carlsbad, N. Mex	\$4,000.00
Gerard H. Matthes.....	Engineer in charge of ac- counts.....	do	2,000.00
W. M. Reed	Engineer in charge of Hondo project.....	Roswell, N. Mex	2,700.00
W. W. Schlect.....	Engineer.....	do	1,800.00
Harry T. Patterson	Assistant engineer.....	do	1,600.00
H. L. Eames	Engineering aid.....	do	900.00
E. W. Myers	Engineer Carlsbad project	Carlsbad, N. Mex	1,800.00
A. T. Michelson.....	Engineering aid.....	do	1,000.00
B. S. Drane	do	do	900.00
Charles H. Sanders	Field assistant.....	do	a 100.00
J. L. Rhead	Assistant engineer, Rio Grande project.....	Las Cruces, N. Mex	1,400.00
H. H. Carter	Field assistant	do	a 75.00
NORTH DAKOTA.			
H. A. Storrs	Electrical engineer.....	Williston, N. Dak	3,300.00
F. F. Prendergast.....	Assistant engineer	do	1,400.00
G. O. Sanford	do	do	1,600.00
A. T. Nelson	do	do	1,600.00
OKLAHOMA.			
James G. Camp	Engineer.....	Snyder, Okla	1,800.00
G. L. Warner	Assistant engineer	do	1,200.00
J. D. Forster	Assistant topographer.....	do	1,200.00
F. L. Humphrey	Engineering aid.....	do	900.00
OREGON.			
D. C. Henny	Supervising engineer.....	Portland, Oreg	4,200.00
E. G. Hopson	Assistant supervising engi- neer.....	do	3,600.00
John T. Whistler.....	District engineer.....	do	2,200.00
H. D. Newell	Engineer.....	do	1,800.00
E. I. Davis	do	do	1,600.00
W. R. Saxton	Assistant engineer	do	1,200.00
G. Stubblefield	Engineering aid.....	do	1,000.00
R. S. Hall	do	do	1,000.00
Thomas Hawthorne.....	do	do	720.00
Frank C. Dillard	do	do	a 60.00
H. W. King	Assistant engineer	do	1,800.00
G. G. Mair	do	do	1,500.00
Ivan Landes	Engineering aid.....	do	1,000.00
SOUTH DAKOTA.			
R. F. Walter	Engineer in charge	Belle Fourche, S. Dak	2,700.00
H. E. Green	Engineer.....	do	2,000.00
W. W. Patch	do	do	2,400.00
F. H. Tillinghast.....	Assistant engineer	do	1,400.00
F. C. Magruder	do	do	1,500.00
J. L. Mann	do	do	1,500.00
A. W. Walker	Engineer in aid	do	1,000.00
B. Franklin	Concrete inspector	do	a 100.00
UTAH.			
G. L. Swendsen	Engineer.....	Salt Lake City, Utah	2,200.00
W. D. Beers	Assistant engineer.....	do	1,500.00
H. S. Kleinschmidt	do	do	1,080.00
H. W. Sheley	Engineering aid.....	Salt Lake City, Utah	1,080.00
A. B. Larson	do	do	1,000.00
W. G. Swendsen	do	do	1,080.00
WASHINGTON.			
Joseph Jacobs	Engineer in charge Yakima Valley.....	North Yakima, Wash.....	3,000.00
T. A. Noble	Construction engineer, Tie- ton project.....	do	2,200.00
Christian Andersen.....	Engineer in charge Okano- gan project.....	do	2,400.00
Ferd. Bonstedt	Engineer.....	do	1,800.00
O. Laugaard	Assistant engineer.....	do	1,200.00
P. W. Price	do	do	1,600.00
C. E. Hewitt	do	do	1,400.00
L. J. Charles	do	do	1,400.00

a Per month.

Organization of the reclamation service—Continued.

Name.	Position.	Where employed.	Salary.
C. Casteel	Assistant engineer		\$1,200.00
H. J. Doolittle	Engineering aid.		1,500.00
C. B. Cox	do		1,200.00
C. E. Slonaker	do		900.00
A. A. Eyller	Field assistant.		α 70.00
R. F. Melin	do		α 60.00
R. B. Williamson	Legal assistant		α 125.00
WYOMING.			
Jeremiah Ahern	Engineer in charge Shoshone project.	Cody, Wyo	3,000.00
D. W. Cole	Constructing engineer	do	2,700.00
Guy C. Emerson	do	do	3,000.00
C. P. Williams	Engineer, Shoshone project.	do	2,400.00
A. H. Perkins	do	do	2,200.00
E. S. Ela	do	do	1,600.00
E. F. Tabor	Engineer in charge canal surveys.	do	2,000.00
F. H. Brundage	Assistant engineer	do	1,400.00
A. C. Downey	do	do	1,200.00
G. F. Harley	do	do	1,200.00
S. K. Baker	do	do	1,200.00
P. S. Craig	Engineering aid.	do	1,000.00
W. I. Kettlewell	do	do	900.00
V. W. Russell	do	do	900.00
I. B. Hosig	do	do	900.00
R. C. Soper	do	do	900.00
Carroll Paul	do	do	900.00
W. H. Fisher	do	do	α 85.00
E. H. Baldwin	Field assistant	Pathfinder Dam, Wyoming.	α 250.00
L. V. Branch	Engineer	do	1,800.00
C. R. Steiner	Assistant engineer	do	1,500.00
W. J. Sussex	do	do	1,500.00
E. W. Vernier	Engineering aid.	do	900.00
LAND AND LEGAL MATTERS.			
Morris Bien	Supervising engineer, in charge.	Washington, D. C	3,600.00
A. E. Chandler	Engineer	do	2,700.00
J. M. McKinney	Examiner	do	2,100.00
C. A. Mansuy	Assistant examiners.	do	1,600.00
O. G. Cowhick	do	do	1,200.00
John C. Wallis	Field assistant.	In the field	α 140.00
C. S. Witbeck	do	do	α 125.00
E. H. Bispham	do	do	α 65.00
Mrs. E. W. Ballard	Stenographer	Washington, D. C	1,200.00
Mrs. G. B. Fowler	do	do	1,200.00
LAND CLASSIFICATION AND SUBDIVISION.			
W. H. Heilman	Scientist, in charge of soils	Berkeley, Cal.	1,800.00
H. W. Marean	Assistant engineer of soils.		1,400.00
F. W. Huber	Assistant engineer		1,200.00
Lewis Foster	Engineering aid.		1,200.00
George A. Hammond	Superintendent of drilling	Salt Lake City, Utah	α 200.00
AUDITING AND COST KEEPING.			
C. H. Fitch	Engineer, chief auditor	Washington, D. C.	3,300.00
E. T. Perkins	Engineer, traveling auditor.	Los Angeles, Cal.	3,000.00
N. E. Webster, jr.	Accountant.	Washington, D. C.	2,200.00
F. H. Cass	Transportation agent.	Chicago, Ill.	α 200.00
C. E. Harris	Rate and division clerk	do	1,100.00
A. M. Waldner	Stenographer	do	900.00
E. G. Paul	Engineer, in charge of equipment.	Washington, D. C.	2,000.00
DISBURSING.			
J. W. Spencer	Special disbursing agent	Yuma, Ariz.	2,000.00
E. G. Lind	do	Roosevelt, Ariz.	2,000.00
J. C. Gawler	do	Casper, Wyo	1,600.00
H. E. Essley	do	Montrose, Colo	1,600.00
F. W. Kirksey	do	Cody, Wyo	1,600.00
F. L. Cavis	do	Boise, Idaho	1,500.00
J. W. Swift	do	Glendive, Mont	1,600.00
H. P. Seidemann	do	Belle Fourche, S. Dak	1,400.00
W. S. Arthur	do	Huntley, Mont	1,200.00
F. W. Brose	do	Roswell, N. Mex	1,500.00
A. H. Gullickson	do	Fallon, Nev	1,500.00

α Per month.

Organization of the reclamation service—Continued.

Name.	Position.	Where employed.	Salary.
C. C. Hogue	Special disbursing agent.....	Klamath Falls, Oreg.....	\$1,400.00
G. M. Eba	do	Williston, N. Dak.....	1,500.00
S. T. Olsen	do	Salt Lake City, Utah.....	1,200.00
C. T. Prall	Special disbursing agent; also assistant engineer, Milk River project, Montana.	Browning, Mont.....	1,600.00
H. A. Yates	Special disbursing agent.....	Portland, Oreg.....	1,200.00
ACCOUNTS.			
R. C. Williams	Bookkeeper	Washington, D. C.....	1,600.00
W. M. Haley	do	do	900.00
E. J. Wolcott	do	do	1,000.00
C. Merrill	do	do	1,000.00
Mrs. Jennie T. Davis	Clerk, statistical expert	do	1,600.00
Miss H. A. Fellows	Clerk	do	1,400.00
Miss Sarah R. Moore	do	do	1,200.00
C. G. Duganne	do	do	1,200.00
L. R. Wilson	do	do	1,200.00
STATISTICS.			
C. J. Blanchard	Statistician	Washington, D. C.....	2,200.00
L. F. Schmeckebier	Clerk	do	1,800.00
DRAFTING AND MAP REPRODUCTION.			
H. V. Lemenager	Chief draftsman	Washington, D. C.....	2,200.00
J. H. Pellen	Draftsman	do	1,600.00
P. A. Roendorn	do	do	1,200.00
F. M. Hart	do	do	1,200.00
D. P. Barnette	do	do	1,200.00
W. H. Criswell	do	do	1,200.00
J. C. Mulford	do	do	1,000.00
S. C. Flake	do	do	840.00
Miss F. W. Wieser	do	do	1,400.00
G. W. Lewis	Apprentice draftsman	do	480.00
Walter Waugh	Messenger	do	600.00
TECHNICAL REVIEW.			
F. W. Hanna	Engineer, in charge	Washington, D. C.....	1,800.00
W. I. Swanton	Engineer draftsman	do	1,600.00
T. B. White	Assistant engineer	do	1,200.00
Louis Ross	do	do	1,200.00
Jos. H. Root	Clerk	do	1,400.00
CORRESPONDENCE AND RECORDS.			
C. N. McCulloch	Stenographer	Washington, D. C.....	1,600.00
J. C. Waite	do	do	1,400.00
T. E. Brown	do	do	1,400.00
Mrs. L. Littlepage	do	do	1,200.00
J. B. Beadle	do	do	1,000.00
L. C. Appelman	do	do	900.00
P. G. Monk	do	do	900.00
Miss Eva E. Evans	do	do	1,000.00
Mrs. M. B. Bibb	Copyist	do	720.00
F. E. Tyler	Clerk	do	900.00
Mrs. M. B. Coffin	do	do	1,000.00
Miss S. L. Templeton	do	do	900.00
A. Oehler	do	do	600.00
W. S. Warren	Messenger	do	720.00
Jesse Myer	do	do	600.00
A. B. Whitman	do	do	480.00
W. J. Frawley	do	do	480.00
CEMENT TESTS.			
Richard L. Humphrey	Cement expert	Exposition grounds, St. Louis, Mo.	⌘10.00
C. H. Stone	Analyst	do	1,600.00
J. Y. Jewett	Cement expert	do	1,600.00

aPer diem.

Secretary HITCHCOCK. Mr. Chairman and gentlemen, the statement I have submitted is about as complete and exhaustive as can possibly be made up to the date at which it was rendered, namely, the 31st of December, 1905. It gives in detail all the projects, the amount received, the amount expended, and the estimates for the ensuing quarter, with, I believe, also the answers to the questions which were asked with respect to the number employed and their duties, and also their compensation. I do not know of anything further at this time that we can add to that, except to say that we are engaged in a very tremendous work, in which the whole country is interested, especially the western part of it, and the projects that we have approved and partially undertaken and contracted for will, I think, realize the purpose and object of the reclamation act, when we get to the end.

We, perhaps, have gone ahead a little faster than we possibly might have done, but at the same time the importance of getting this work done at the earliest possible date, and in the best possible manner, will be an excuse, if any is needed, for the expedition that we have had. It has been a tremendous work, and I think since the act was passed in 1902 that great results have been accomplished.

The CHAIRMAN. You have a great deal of pressure brought to bear on you to press the work forward rapidly, I imagine, from different sections?

Secretary HITCHCOCK. There is no question about that, Mr. Chairman. Every section has been pressing its particular claims. In fact, there are some sections, notably in the Northwest, California, and the Pacific coast, where we could not begin to comply with the requests that were made for work to be done. It was simply impossible. We had not the money. As it is, we have spent within \$600,000 of all our income. I have maintained all along that there are two things to look at in this whole question: One is from the professional side and the other is from the business side. The professional side, of course, is very necessary and, in fact, it is indispensable. We must know what we are doing, under the advice and reports of hydraulic engineers and those who are more familiar with those things than any unprofessional man is or can be. At the same time, you have to take a business view of it as to the matter of making contracts, the people we are dealing with, the allowances that are to be made in the matter of prices, and so on.

Just now we are laboring under some difficulty. All these contracts have been made under advertisement. We have taken the greatest possible pains to have the widest advertisement, in order to keep within the law absolutely with respect to expenditures, and with respect to getting the work done at the earliest possible date by responsible parties. But the prosperity of our country has been such that, so far, we have met with some failures on the part of these contractors—two or three that I am aware of at the moment. We had one last week, and the reasons given are that the prosperity of the country is so great, railroad building is so progressive, and development of all kinds is going on so rapidly that some of the contractors have had to lay down and could not carry out their contracts.

The CHAIRMAN. They find it very difficult to secure labor?

Secretary HITCHCOCK. Yes, sir.

The CHAIRMAN. And the cost of labor has increased.

Secretary HITCHCOCK. Yes. Incidentally, to illustrate my point: The other day we had an application from an Indian agent in the Northwest, and it came over to me, and I saw that he had about \$1,500 of contingent fund left, and that he wanted to spend \$800 of it in clearing out ditches on the Indian reservation, and wanted to pay the Indians \$1.75 a day. I immediately took it up, and thought that that much for an Indian was an outrageous price, especially as the agent only had \$1,500 left, and wanted to spend over half of it for the clearing out of the ditch. I made inquiries and found that the railroads in that section were willing to pay the Indians \$1.75, owing to the fact that I mention that the progress and prosperity in building of railroads, and so forth, were so great and so rapid that it was impossible to get the labor required. It has also forced some of these contractors to simply lay down on their contracts.

That brings up the question of what was referred to in the Bureau as "force employment." I am not prepared to say to what extent we can go. There may be emergencies which will justify force employment—that is, putting on our own force instead of doing it by contract. But that is such a delicate question and involves such legal determination that I referred it to our law department to know just how far the Secretary of the Bureau will be justified in taking that view, that force employment can be substituted for contract.

Mr. DWIGHT. There is no provision in the original act that provides for that, is there?

Secretary HITCHCOCK. There is a reference to that, but it is a question as to the interpretation of the act. That is the point that I have just now spoken of. We reached that last week, and had two or three cases under that, and just before it came up I asked the law division of our Department to let me know when they would give us a decision, and they said that probably we would get a decision this afternoon.

Mr. KENNEDY. I would like to ask a question—

Secretary HITCHCOCK. It is a question that is not to be passed upon lightly. This reclamation law, by the way, I think, is one of the best pieces of legislation ever enacted by Congress for the benefit of the whole people. The details of it are magnificent, but at the same time there is the law, and the purpose of the Department is to keep absolutely and strictly within the letter of the law as well as the spirit of it. We will have an answer to that particular point within a few days.

Mr. KENNEDY. The question I wanted to ask was whether or not you were referring to force work as applied to defaulted contracts or to work generally?

Secretary HITCHCOCK. The question is whether force work shall be substituted for defaulted contracts.

Mr. KENNEDY. Yes.

Secretary HITCHCOCK. That is the point. Whether, in other words, the emergencies of the situation, or the advantages to be gained by earlier completion of the work, will justify us under the law in undertaking to do it by day labor ourselves, rather than to lose the time in advertising and considering additional contracts. I have only done it in one or two cases, so far, upon the special and direct and specific recommendation of the director of the reclamation service, Mr. Walcott. I have always insisted upon having his specific, absolute recom-

mendation that it shall be done, because of the existence of the emergencies of the case. For instance, just now in Colorado and all through the West and South there have been tremendous rains. As we all know, the rains in the West, Southwest, and, in fact, all the way along the Pacific coast and the southern part of the country have been tremendous, and in some cases they have washed away some of the work. It would be worse than folly not to try to prevent the further injury to that work by hesitating a moment to replace it or to stop it in some way. That becomes a matter of necessity. There can be no hesitation about that at all. But whether or not we can go still further and employ this labor ourselves, under the impression that we may or may not be able to do it cheaper than another contractor would do it, is a question that I want the legal department to determine.

The CHAIRMAN. I think, Mr. Secretary, that particular question has been specially brought to the attention of some of the members of the committee in connection with the uncompleted Gunnison tunnel of the Uncompahgre project, where the original contractors, the Taylor-Moore Construction Company, failed and bids were asked for for the completion of the tunnel. Three bids were received. I assume that the officers of the service considered those bids too high. At any rate, on page 119 of the Annual Report, the statement is made:

On September 26, proposals for the completion of the tunnel were received. Three bidders submitted proposals, which are shown on this page. All bids were rejected, and orders were given to complete the work under Government supervision.

Now, from those bids, if the bids on this page are the bids for that work, that completed work would cost, under the lowest bid, \$1,541,100; under the second bid, \$1,573,016; under the third bid, \$2,123,300; so that it is a very large work. The question in the minds of some members of the committee is this: Whether that character of work, so large a work as that, can properly be undertaken by force account. First, there is a question of the law, and then the question of policy. As to the question of law, that depends upon the interpretation given to section 4 of the reclamation act, which is as follows:

That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same.

The legal question is whether, under that language, the Secretary is authorized to go into as large a construction as that by force account. Then, of course, follows the question of policy in those matters. Is it good policy to undertake so large construction by force account, even if you have the authority to do it?

Secretary HITCHCOCK. In reply to the chairman I would say that the Gunnison tunnel project originally—in fact, from the start—was estimated to cost a million and a quarter. It is a unit in itself. It will carry the water into the Strawberry Valley, Utah, where there is a very, very large acreage depending entirely upon that unit work when it is accomplished.

You will note that all of those bids are at least a quarter of a million—two of them a quarter of a million and the other three-quarters of a million—more than the original estimate, which was, I understand, very carefully estimated by the experts of the service to cost not exceeding a million and a quarter, and of course they could not recommend those three bids, two of them at a quarter of a million each and the other three-quarters of a million more, without a further

careful examination as to what the reclamation service itself could do; and it was upon the specific assertion and apparent demonstration on the part of the reclamation service, through its engineers and those on the spot and with the experience that they had had in such other work, that I authorized the force in this instance. Other cases have come up since, and on that question I am not fully satisfied in my own mind. In other words, my desire is to keep so absolutely within the letter of the law, as well as the spirit, that as those other cases have come up I have referred them for this legal opinion, which you shall have immediately.

But you spoke of the inference a little while ago. The strongest possible kind of pressure has been brought upon the Department and the reclamation service by the representatives from Utah, notably the two Senators.

The CHAIRMAN. You mean Colorado, do you not?

Secretary HITCHCOCK. I mean Colorado; yes. And the idea was to expedite the work, so far as we could legitimately do so. I do not think in this case it has made a mistake. So far as we have gone the facts warrant the application of the force instead of the contracts. But it is to guard against the future in this matter that we are going to have the question settled. Necessarily I must be governed by the opinion of the experts of the reclamation bureau.

The CHAIRMAN. And the legal department of your office relative to the law points?

Secretary HITCHCOCK. Of course.

Mr. DWIGHT. The same question is up with other Departments of the Government—the question of labor. It is up with the Post-Office Department in the mining districts, for example.

The CHAIRMAN. Yes; they all have to meet that question.

Secretary HITCHCOCK. We have that question up right now. There is a very large firm, J. G. White & Co., of New York, and they do an immense business all over the world, almost, in the Philippines and everywhere else, and they have a number of contracts with us. Senator Carlisle and a representative of this company were in on Saturday.

The question of the eight-hour law had come up, and the stand we have taken so far is that we have nothing to do with it; that we have made the contracts, and they must fight it out themselves. That is now before the Department. White & Co. can show that it is to their personal advantage to have the eight-hour law apply, as they give 15 cents an hour, and if it is eight hours a day, that is 15 multiplied by 8, and they save money in the matter of mere expenditures if they are compelled to observe the eight-hour law. But, on the other hand, they do not want to do that, because they are under a penalty and under a bond to finish that work within a certain time. I do not think, at present, that it is a matter for us to interfere in at all. There is a contract and a bond, and the work is to be done, and we are looking to them to do it in the time specified; but it has raised that eight-hour question.

The CHAIRMAN. The thought that has occurred to some of the members of the committee—at least it has to me in connection with a project like the Gunnison tunnel—is that unless there was some likelihood of damage being wrought by the slight delay in the work, which would not be possible, of course, in that case, and if those bids seemed high that another advertisement—another publication of the work to

be done—might possibly bring a reduction in the tenders. At least it would demonstrate whether or not, under the conditions existing—and the contractors of course must take into consideration the cost of labor and the cost of material—whether under the conditions existing contractors could do the work for less than the lowest bid received. Of course we all know that the cost of material and the cost of labor has considerably increased in the last year or two.

I want to ask this question, Mr. Secretary, whether it is not true that with regard to most of your contracts you have not let them for less than the estimated cost?

Secretary HITCHCOCK. I could not answer that offhand, Mr. Chairman, without looking into it a little more carefully. My impression is that the contracts have been mostly made at prices which could not be obtained over again. I think, as a rule, the majority of the contracts, in fact all of them, nearly, are at such rates as could not be duplicated. I think in this particular instance, in the case of the Gunnison tunnel, that the director of the reclamation service had reference to the possibility of further rises in the price of labor and material, both in indorsing and recommending, as they did most emphatically, that this particular work should be done under force labor.

I dare say, however, that Mr. Walcott can explain that more fully than I can. I have, necessarily, to go upon their representations, and I try to make them as detailed and as emphatic as possible before any contract is approved. They are on the spot, or their representatives are, out in the country, and they know the conditions of labor there, and of climate, and all the conditions that surround an important piece of work, and I must necessarily be governed more or less by what they say.

Mr. REEDER. Suppose your estimates give a certain figure for a piece of work like that Gunnison tunnel, and then your contracts justify that estimate; but the contract is not fulfilled, and you do it under your own direction or under the direction of the Department and it costs more—where does that cost then come from? Does it come from this fund or is it charged to the persons who finally purchased the land?

Secretary HITCHCOCK. Where they have a contract, as I said a while ago, they are under heavy bond, and we collect that bond. We do not let them off.

Mr. DWIGHT. Have there been any cases where collections have been enforced under a bond?

Secretary HITCHCOCK. I do not recall any at the moment, but that is the policy of the Department.

Mr. REEDER. In the Gunnison tunnel, do you hold that bond on that contract still?

Secretary HITCHCOCK. I could not say as to that, offhand. That is the general policy. Where it is possible to enforce it, we do it.

Mr. REEDER. Suppose there was a loss made by doing this work by the other process, and it even seemed best to do it for certain reasons, then would the people that get that water have to pay that extra cost, or would the irrigation fund lose it?

Secretary HITCHCOCK. In the first place, the irrigation fund would have to pay it, for there is no other source of getting the money, and we would add that to the cost of the work under the law, and it would come back through the water-users' associations.

Mr. REEDER. It would be added to the cost to the users?

Secretary HITCHCOCK. Yes, sir.

Mr. REEDER. You said that you had spent all of your income except \$600,000?

Secretary HITCHCOCK. Yes; we have not spent it, but we have estimated it.

Mr. REEDER. Oh!

Mr. KENNEDY. I understood that there were three bids for the Gunnison tunnel work, but that none of them were accepted?

Secretary HITCHCOCK. Yes, sir.

Mr. KENNEDY. So that there was no contract and no bond at all in that case?

Secretary HITCHCOCK. No second contract.

The CHAIRMAN. I think I can explain that. There were a number of bids—I do not know how many in the first instance—the lowest bid being that of the Taylor-Moore Construction Company. A contract was entered into with the Taylor-Moore Construction Company upon which they defaulted.

Mr. KENNEDY. I understand.

The CHAIRMAN. Later, that is in September of that year, bids were again called for, and at that time three bids were tendered, none of which were accepted.

Mr. KENNEDY. The bond on the first contract, then, would, theoretically at least, be liable for the increased cost?

Secretary HITCHCOCK. That is the point.

Mr. COOPER. What is the difference between the contract price and the lowest bid you obtained in the second advertisement?

Secretary HITCHCOCK. About \$250,000. There were two at \$250,000, and the third one was \$2,000,000, which would be three-quarters over the estimate which the director believes it can be done for.

Mr. COOPER. So far as the work has actually proceeded under your direction, has it been done within the estimates?

Secretary HITCHCOCK. So far, sir, except in one or two cases of defaulted contracts, where we are still laboring with them, to try to get—

Mr. COOPER. The Department feels, then, that these last bids made were too high?

Secretary HITCHCOCK. The director and the reclamation service felt that they were too high, and therefore recommended this resort to force work.

In answer to the question of a moment ago, the actual expenditures so far have been \$8,683,254.42. We have received for the reclamation fund, up to December 31, 1905, \$28,076,108.02. The expenditures being as above stated, the balance in the fund to-day available, but not contracted for, all of it, is \$19,392,853.60.

The CHAIRMAN. You say that is all contracted for?

Secretary HITCHCOCK. All but about \$656,947. It is all appropriated. It is not all contracted for.

The CHAIRMAN. There is \$19,000,000 available, as I understand, all but \$600,000 of which is apportioned?

Secretary HITCHCOCK. Either contracted for or apportioned.

My object has been always, as a business proposition, to keep absolutely within the prospective income that we might expect from the

sale of this land through the Land Office. We have had a good deal of a fight—I say a fight, as that is almost what it has amounted to—to leave a certain margin. In making these estimates on which contracts are based the reclamation fund will reserve 10 per cent at least for contingencies, but I have repeatedly insisted that that is not enough. I have had more or less to do in my experience with manufacturing, building, and railroading and mining, and I know that it is rarely that such estimates are not exceeded.

I have insisted right along upon having a larger margin; but in spite of the persistence with which the demands have been made upon us I have determined to have a larger margin and to keep at least a million and a half. I have done that, because in making our estimates we have estimated the probable income up to 1908, looking three years ahead from the time the estimates were made, taking every reasonable view of what we might count upon. My expectation and my hope was that the timber and stone act, which is one of our principal sources of income, would be repealed. Much as we want the money for the reclamation fund, I believe the injury done to the country at large by the existence and maintenance of the timber and stone act and the destruction of timber at ridiculous prices is so great that I should have been glad to see it repealed. I think it is a settled matter now that there is no possibility of its being repealed, and therefore we modify our calculations, and they may be increased. The last statement from the Land Office is that they may be increased a little bit.

The CHAIRMAN. I think it would be well to put in, right at this point in the hearing, page 78 of this tabulated statement of the receipts up to this time that you sent to the committee, and the estimated receipts up to June 30, 1908.

(The statement referred to is as follows:)

Receipts and expenditures, reclamation fund, past and prospective.

[Fiscal years.]

Actual receipts:		
1901.....	\$3, 144, 821. 91	
1902.....	4, 585, 520. 53	
1903.....	8, 713, 996. 60	
Actual expenditures, 1903		\$286, 440. 21
Actual receipts, 1904	6, 826, 253. 59	
Actual expenditures, 1904		1, 461, 305. 01
Actual receipts, 1905	4, 805, 515. 39	
Actual expenditures, 1905		3, 714, 523. 64
Estimated receipts, 1906	a 3, 250, 000. 00	
Actual expenditures:		
First quarter	\$1, 419, 605. 67	11, 467, 484. 29
Second quarter.....	1, 801, 379. 89	
Estimated expenditures:		
Third quarter	2, 316, 094. 87	13, 000, 000. 00
Fourth quarter	5, 930, 403. 86	
Estimated receipts, 1907	a 3, 000, 000. 00	
Estimated expenditures, 1907		13, 000, 000. 00
Estimated receipts, 1908	a 2, 750, 000. 00	
Estimated expenditures, 1908		6, 489, 407. 85
Estimated balance unallotted June 30, 1908		656, 947. 02
		37, 076, 108. 02
		37, 076, 108. 02

^a From estimates of the General Land Office.

Mr. COOPER. Does that show what return there has been or will be to the fund?

The CHAIRMAN. This is a statement of the past, and prospective up to June 30.

Secretary HITCHCOCK. That is of the income and expenditures, not of the returns from the work itself.

The CHAIRMAN. It is in the statement that the Secretary sent us in answer to our letter inviting him to appear before the committee, page —.

Secretary HITCHCOCK. That is not an estimate, however, of the returns from the work itself.

Mr. COOPER. How soon do you expect any returns?

Secretary HITCHCOCK. We should get some from the smaller projects next year—one down in Arizona, for instance. We also hope that the Truckee-Carson project will come in during the year, or within two years, at all events. So that, within two or three years we should begin to get some returns; but not as large as we would like to have.

Mr. COOPER. It would not be contemplated, under the present state of the Treasury, or the funds available, to undertake any more large projects?

Secretary HITCHCOCK. We will not do it unless we have the money.

Mr. REEDER. Are you making any preliminary surveys now, expending any part of this money where there is no prospect of doing the work?

Secretary HITCHCOCK. No; I can not say that we are, except that there are certain projects and certain information that has been asked for in different parts of the country. Take the California coast, for instance. The city of Los Angeles is in a very desperate condition with respect to water supply. That is one of the projects, known as the Owens River project, that we had to turn down. It would cost enormously more than we had money in sight to pay for. At the same time it is very necessary as a part of the work of the Geological Survey primarily, but also of the reclamation service, because the same men are doing hydrographic work. It is only at their request that we are doing some work of that kind; and so, if there is any way in which we could do a part of this work, if not the whole of it, when we get more funds available—

Mr. COOPER. There is a great conflict there between water users associations, is there not?

Secretary HITCHCOCK. Yes, sir.

Mr. COOPER. And it is almost impossible to harmonize them.

Secretary HITCHCOCK. The upper end of the valley has certain factories, and they do not want the water shut off from them. Los Angeles is a city that is rapidly increasing in population, and its water supply is absolutely inadequate, if a fire should come, for instance. I am told that there were ten or twelve days recently when everything was so dry that if there had been a fire everything would have been swept away.

Mr. REEDER. Does that come within the scope of this law, to furnish that water?

Secretary HITCHCOCK. Not for the city of Los Angeles at all. That is one reason why we could not do it. But connected with that is a

scheme of reclamation around about the city, some thousands of acres which were brought in incidentally.

Mr. COOPER. Then, referring to your last statement, would it not require some additional legislation in order to authorize you to do that?

Secretary HITCHCOCK. Yes; we could not do that without further legislation. It would be based entirely on the reclamation law, and the results that would come to that section through the reclamation law. The city supply we would have to ignore entirely.

Mr. REEDER. Then, I understand that you have made, and in fact from this report it seems that you have made, preliminary surveys and determined the feasibility of more projects than you can put in until 1908, at least?

Secretary HITCHCOCK. That would necessarily be so, because we had to do that to determine which should have the preference.

Mr. REEDER. Are you now expending any of this money toward discovering still other projects?

Secretary HITCHCOCK. No; I do not think we are to any appreciable extent; but the force being on the ground undoubtedly they are looking into some projects that may hereafter come up.

Mr. REEDER. But you are spending no great amount of money on it?

Secretary HITCHCOCK. No, sir.

The CHAIRMAN. The general policy is, as I understand it now, to confine expenditures to projects already undertaken?

Secretary HITCHCOCK. Absolutely.

The CHAIRMAN. And so far as further investigations are concerned, to only make them where there seems to be some particularly urgent reason for doing so?

Secretary HITCHCOCK. That is right, sir. That is correct.

Mr. REEDER. What amount of money from this irrigation fund will probably be wrapped up in different units of projects that are not yet completed? For instance, as we take it in the Minidoca project, you go to a certain part of the river and take in a certain amount of land, and then there are one or two or three other units in the project. What portion of the building of the great reservoir or of the amount involved in that will remain wrapped up in that project that will not come back into the fund until the other units are finished?

Secretary HITCHCOCK. Without figuring and investigation I can not answer that question.

Mr. REEDER. Is there a large amount?

Secretary HITCHCOCK. I think you can get it out of this statement which I have submitted, which is very exhaustive. The Minidoca project appropriated first \$1,300,000. Next, what is called the Payette-Boise project, another \$1,300,000; altogether, \$2,600,000. Of that about 7 per cent is done. I can not tell you whether that represents the reservoir or—

Mr. REEDER. But when the first unit is done then a part of what is called the original investment will remain there until the second unit is completed and then be charged to that, and then a part will remain for the third, so that we are going to get a large amount of money wrapped up in these units of different projects that are not yet completed and will not be completed for a number of years, and thus wrap up large sums of money of this fund.

Secretary HITCHCOCK. I can only say in answer to that that the

policy of the reclamation service and the Department is this: To finish such units as can be put into service at the earliest possible moment, so that they will contribute something toward the payment of what remains to be done.

Mr. REEDER. I think that is a good policy.

The CHAIRMAN. In any case, however, I understand, Mr. Secretary, that where you have a very large project, consisting of several units, the first units necessarily cost the most per acre, and there must of necessity in most of those projects be a greater expenditure for the first units than the charge is per acre?

Secretary HITCHCOCK. That is right.

The CHAIRMAN. The cost of the first units will in some cases be greater than the lands can bear, or in justice should bear, and therefore necessarily there is some money "wrapped up," to use the expression of my friend from Kansas; that is, the return of which will be delayed until the final units are completed?

Secretary HITCHCOCK. It must be so, because we can not tell what charge to make the water-users' associations until the thing is practically completed.

Mr. COOPER. Then it would not be possible for those that have land that would be comprised within the first unit to get a clear title to the land until all the work was completed?

Secretary HITCHCOCK. That is a matter of detail that we will have to arrange in the case of each project. We will get the money back as early as possible and put the water on the land.

Mr. COOPER. That is true, but some of these projects are so large, consisting of maybe three or four units, that they may run beyond the ten-year limit, and if a part of the first unit, for instance, the reservoir, which costs such a large sum of money—if part of that is to be charged up on the second, third, or fourth unit you could not get a clear title to the land under the first unit until this matter was entirely adjusted so that you would know just how much was to be charged to every acre of land.

Secretary HITCHCOCK. What you properly call a clear title can not be obtained until the whole thing is done. It inevitably happens that the reservoir cost must remain as a part of the total cost undivided.

Mr. COOPER. That would be my idea of it, because the first unit would make it cost entirely too much. It might cost \$50 or \$75 an acre.

Secretary HITCHCOCK. It may be 50 per cent of the whole work. Those are details that we will have to work out in due course, bearing in mind the business methods that should be applied to cases of that kind, namely, to get the water on the land at the earliest possible moment so that we can get the cost to the users of that particular land and thereby get some returns from them.

Mr. COOPER. You would have to make a very indefinite sort of a contract with the first unit land owners?

Secretary HITCHCOCK. No; we make the contracts to be finished as soon as possible.

Mr. COOPER. But you could not tell how much was to be charged against their land?

Secretary HITCHCOCK. No, sir.

Mr. COOPER. Therefore your contract would have to be more or less indefinite.

Secretary HITCHCOCK. Indefinite, yes; just as my answer is now necessarily indefinite.

Mr. COOPER. That certainly would make it a very complicated and troublesome matter in some cases.

Mr. REEDER. If there are four different units in a project, do you purpose in the outcome to see that each acre shall pay exactly the same price for the water?

Secretary HITCHCOCK. The original plan is: You take the total cost of the project, then they organize a water users' association, and they obligate themselves to pay per acre whatever the average cost will be for that service.

Mr. REEDER. Suppose that when you get through that first project, your judgment is that it will cost \$30 on the acre, and you charge accordingly?

Secretary HITCHCOCK. Yes.

Mr. REEDER. And when you get through, you find that it only costs about \$27.50. Do you purpose, then, to rebate to these people right at first, or simply have that business settled and done?

Secretary HITCHCOCK. I think it should be settled and done, because when we reach a point of supposed final settlement with these water users there will be necessarily some little details which will require the reservation of that extra two or three dollars, as the case may be, in protection of the service that we have already prepared for them.

Mr. REEDER. So that the cost of the first project will practically be settled at first.

Secretary HITCHCOCK. I think so.

Mr. REEDER. And possibly they will pay a little more than actually necessary; but even if the others are brought up to that, it will simply be to the advantage of the irrigation fund?

Secretary HITCHCOCK. Yes, sir; not only to the advantage of the irrigation fund, but to the advantage of the water users, because we will use that, and it can not be used for any other purpose than, for instance, cleaning out ditches, etc. There are always little things that have to be attended to. I should say, offhand, without knowing the details of any particular project, that as a business proposition that should be reserved for contingencies of that kind in the interest of the water users themselves.

Mr. REEDER. So that, in that way, the man that first paid in his \$30, if he paid a few dollars too much, would get that in the way of a lack of payment in the future, for sustaining the project?

Secretary HITCHCOCK. Not only that, but before we go into those things it is generally understood by the water users signing the association bond, who obligate themselves to pay what it may cost; they generally know about what the thing will cost. It is only fair to give them an estimate as nearly as we can of whether it will be \$25 or \$30 or \$35 or \$40 an acre. They sign that bond with that expectation or understanding; in other words, that the reclamation fund and the Department will do the fair, honest thing by them, and charge them no more than the actual cost.

The CHAIRMAN. The complaint is made that the estimates which have been suggested are pretty high compared with the cost under private works. We understand, in view of the better construction of Government works, that that necessarily would be the case to a cer-

tain extent; but what I wish to know is whether the estimates which you are making of the cost are pretty carefully made, with a view of not going above the actual cost of construction?

Secretary HITCHCOCK. That is so, Mr. Chairman. We want to get them as nearly accurate as possible. The reputation of those that make the estimates is at stake. If it is found that they are away out of the way, it will come back to them. In the second place, it would not be right to do so, and, in the third place, I think, if any complaints of that kind have been made, that they have probably come from those who did not get the contracts and who say that they could do this or that so much cheaper.

The CHAIRMAN. This suggestion was made by an officer of the reclamation service. I just refer to it as indicating a thought with which I am not in harmony. In speaking of one particular project he stated that in his opinion the cost of construction would not be over so many dollars per acre—a certain sum per acre—but he said: "This project is in a region where the conditions are such—the character of the soil, the climate, the range of products—that people could well afford to pay a larger price, and in that case we shall probably set the cost per acre a little higher than the actual cost of construction." Now, I assume that your office does not view your authority under the law in that light. You would have no authority under the law to charge the settler more than the cost of his project, even though the cost might be less, possibly, than the value of the lands of that character in the locality.

Secretary HITCHCOCK. I would not indorse anything like that, Mr. Chairman, at all.

In bridge building and work of that character engineers will talk about a "factor of safety," and I believe they use that factor as the figure 5 in some way or other, and it is very natural that a professional man should want to leave a margin to cover any mistakes that he may make. To a reasonable fair extent that is sensible and proper, because when you come to dig in the earth to build your construction works, dams, and things like that, contingencies may arise which justify these professional men in allowing a margin, but not to the extent of saying that just because the people are able to pay it, therefore they should be stuck to the limit of whatever occurs to the engineer or professional man. We do not know of anything like that, and I would not tolerate it. That is the first I have heard of a statement of that kind.

Mr. DWIGHT. The Department is not in the speculation business.

Secretary HITCHCOCK. No, sir. We are there to see that the reclamation service is carried out in good faith between the Government and the water users.

The CHAIRMAN. Of course, the question of what the charge shall be rests entirely with the Secretary; but, as I read the law, and as I recall the intent of those who framed it, it seems to me that there would be no authority whatever to charge more than the cost of construction. The portion of section 4 which refers to that particular feature of the work is as follows: "The said charges shall be determined with a view of returning to the reclamation fund the estimated cost of construction of the project;" so that charges are to be made entirely upon your estimate of what the project shall cost. Now, you might estimate that a little too low. That would not be any violation

of the law, if that estimate were carefully made and something occurred that brought the cost higher. It was contemplated, I think, in framing the law that that might occur occasionally, that there might be some work carried out where the return would not fully compensate for some unusual cost.

Secretary HITCHCOCK. Yes.

The CHAIRMAN. Because the language is very carefully chosen. It does not say that the charges shall be the cost of reclamation, but that they "shall be determined with a view of returning to the reclamation fund the estimated cost of construction."

Secretary HITCHCOCK. Three words should have been added just before that word "cost;" that is, "reasonable and proper" cost. Those words should have been added. In other words, the Department should not charge, under any circumstances, more than a reasonable and proper cost, with all the facts before it, of any one particular project, and that cost should represent the amount to be applied to the users.

The CHAIRMAN. I have always taken a view that I think the committee has not entirely agreed with, with regard to this law, that it was not the intent of that language to charge against these projects the cost of examinations and surveys. When we had the reclamation law under discussion the first draft of the bill contained after the words "the estimated cost of construction" the word "only"—the estimated cost of construction only, the thought being to exclude the cost of preliminary examinations.

Secretary HITCHCOCK. I should have to differ with you there, Mr. Chairman.

The CHAIRMAN. Well, most people do.

Secretary HITCHCOCK. I think that the preliminary cost is just as much a part of it as anything else.

Mr. KENNEDY. You would diminish your fund if you did not include it.

The CHAIRMAN. I shall only take up your time a second on this point, but I think it is something that we will have to take up in the future more or less. It has always been my view of the law, and I stated it in my report on the bill, that it was not expected that all of the preliminary examinations should be charged to the projects, and to that extent the reclamation fund was not a revolving fund; that is, it would be slowly diminished, very slowly compared with its volume, by the amount of preliminary examinations.

Secretary HITCHCOCK. I do not see how you would get at the cost unless you included the preliminary expenses.

Mr. DWIGHT. What has been the system of bookkeeping in the Department? Charging to each project these preliminary surveys?

Secretary HITCHCOCK. We are just now at a point where that question has come up—the question of bookkeeping. It came up last week, and I sent a letter to the Director, and he has written me with a view of ascertaining some proper method of cost at any outlying district, with a view of determining just how this cost should be arrived at. I am getting a little ahead of the facts, because it is still a matter under consideration, but you ask the question, and it may not be improper to tell exactly what the situation is. He suggested the employment of some one connected with this large firm of public accountants in the

city of New York, the name of which I forget, and have them or some member of the firm, or their representative, employed at a certain cost per diem with a view of going to the different projects and getting up some system by which we would know exactly what this cost is to be.

Mr. DWIGHT. It seems to me that that would be very wise. I do not see how any Secretary or Department can estimate—

Secretary HITCHCOCK. But my reply to that was this: The Department is in entire sympathy and accord with the suggestion, but the manner of reaching the desired end is another thing. It is one thing to get a firm of public accountants to go down into absolutely new work and inaugurate a system of cost which covers the particular subject, but these matters are subject to governmental conditions. We have to go before the Auditor and the Comptroller with the system. My reply was, therefore, that the proper way to do it is this: The President has appointed what is known as the Keep Commission, and there are on that commission—I speak from knowledge, because we have some twenty men from our own Department that have been detailed to act on that commission—men who are experts on accounting; they have a committee for accounting, and I know personally that there are four or five men on that committee, for instance, one from our own Department, Mr. Evans, who is our financial clerk, who has been thirty years in the service, and there is no more competent man to be found in New York or anywhere else; and there is another man that has been connected with other matters of that kind.

Those men are the ones to elaborate such a system as we will require, through the Keep Commission. They are familiar not only with book-keeping and cost making, and all that sort of thing, but with governmental methods as required by laws, rules, and regulations. To bring in a system which would be in conflict with those governmental laws, rules, and regulations would be a mistake. Those gentlemen are all qualified from experience to take up that question in that way, and that is the way we will do it.

Mr. DWIGHT. However it is reached, it seems to be a wise thing to do.

Secretary HITCHCOCK. There is no doubt about that. The cost sheet is your chart that you sail by. Unless you know at the end of each month just where you are, you are lost. In managing a large industrial work some years ago, I said to our manager, "I want at the end of every week or every month a statement showing, as to the four divisions of our works, where every man was every hour of the day and what the cost of that man was and what he did for it." This manager was an Englishman, and he said he could not do it; that he never thought of doing anything like that. I said, "What do you do?" He said, "We take our stock every six months and figure up our profit and loss." I said, "That may do in England, but it will not do here. We have got to have this statement, and I have got to know at the end of every month exactly what each department has cost."

The plan was adopted, and in less than two months' time this manager came to me and said that he would not be without it for anything in the world. It was the greatest help to him. He could put his finger on every man every hour of the day and know exactly what he was

doing and what it was costing him. That is just what I want to do with our system here now; but we do not need the assistance of outsiders from New York to do it.

Mr. DWIGHT. It makes no difference how it is done, so that it is done.

Secretary HITCHCOCK. That is the point.

The CHAIRMAN. I notice, in the meantime, that you are carrying engineering and surveying expenses along with each project.

Secretary HITCHCOCK. Oh, yes. What would you do with those expenses if you did not put them there—what would you charge them to, under the appropriation act?

The CHAIRMAN. Well, now, I find that there are not a great many people who agree with me in my view of the reclamation act on that particular point. When we began the framing of the reclamation act the thought was not, in the first instance, to charge the settler all of the cost of construction of the works.

Mr. REEDER. Well, I do not want that put down as my view. [Laughter]. My idea was all the time, especially as long as the projects are cheap, and that is what the first projects will be, that the reclamation fund should not suffer the loss of an iota. It may be that I did not pay enough attention to the wording of the act.

The CHAIRMAN. I will remind the gentleman of the fact that the first law, and the one which was debated for a long time in the committee of seventeen, contemplated a payment of only \$5 an acre; and that the second proposition was \$10 an acre, and that when we discussed the proposition of \$10 an acre it was generally understood that the cost would be about \$20. Is not that true? Did we not discuss the bill proposed by the gentleman from Colorado at great length, which proposed about half of the return?

Mr. REEDER. Yes; but—

The CHAIRMAN. Now, we finally agreed upon this bill, and as we finally agreed upon it it contained, after the word "construction," the word "only;" and that word was only stricken out, if the gentleman from Kansas (Mr. Reeder) will recall, on the ground that some one objected to the word as being unnecessary, ungrammatical, and cumbersome, and that the language as written in the bill carried with it the idea that the charges per acre were only to be the cost of construction; that you might include in that superintendence, but that at least preliminary examinations would not be included. And, therefore, as I stated in my report on the reclamation bill, to the extent at least of preliminary examinations, there would be an expenditure from the fund that would not be returned.

Mr. REEDER. I do not remember that, and I do not remember that report. I will say to you this, that I had had no experience in passing laws at that time, but my idea was, when we talked about that amount of dollars, that we thought we had fully covered the cost of the first irrigation project. That was my impression.

Mr. KENNEDY. Would you not consider the cost of plans for a building as part of the cost of construction, part of the cost of the building, Mr. Chairman? I take it that the preliminary surveys are necessary to the prosecution of the work, and therefore properly a part of the cost.

The CHAIRMAN. I want to call the gentleman's attention to this fact: That there will be ultimately a very considerable expenditure in the

examination of projects that are never undertaken. The law which says that the charges shall be made on the basis of the cost of construction will have to be pretty broadly interpreted to permit the addition to the cost of construction of a portion of the expense of general investigation in no wise connected with the project. They examined the Madison River project in Montana, and there is a charge for that. Some day they may undertake that work.

There was an examination of the De Smet project in Wyoming. We hope they may undertake that some day. Many preliminary examinations have and will be made in order to learn the possibility of development in given locations. Even though gentlemen do not take the view that I do—that the cost of preliminary examination on a specific project ought not to be charged up to that project—it seems to me, under the language of the act, that you can not well take the view that the cost of examinations on other projects can be charged up to projects other than those on which those examinations were made.

Mr. KENNEDY. Is that now done?

The CHAIRMAN. There must, of necessity, be——

Mr. KENNEDY. I do not know.

Secretary HITCHCOCK. The law provides that in seventeen States and Territories, I think it is, examinations shall be made with reference to projecting these projects.

The CHAIRMAN. Yes.

Secretary HITCHCOCK. And we certainly could not have done that preliminary examination and made those estimates——

The CHAIRMAN. No.

Secretary HITCHCOCK. That is a part of the whole thing.

The CHAIRMAN. You must carry on that work.

Secretary HITCHCOCK. We must carry on that work.

Mr. KENNEDY. Is the cost of one project, which is not now under taken, taken into account in connection with the projects which are actually undertaken?

Secretary HITCHCOCK. As I understand it, the situation is this: The corps is organized to go to a certain place in a certain State to look at a certain project which, because of data previously in the office of the Geological Bureau, the hydrographic division, indicates the possibility of a project there that is worth looking into. The corps is appointed to go and look at that particular location, and they are paid for that work at that particular place and for that particular project.

Mr. KENNEDY. And that is charged to that project?

Secretary HITCHCOCK. And that is charged, ought to be charged, to that particular project; because, when the construction comes, they could not have begun construction, or at least it would have been foolish to begin construction on a work that had not been previously carefully surveyed, and the wisdom or unwisdom of entering upon that project determined upon. So that I think that is an integral part of the whole project, and therefore a part of the construction.

Mr. KENNEDY. I agree with the Secretary, I think, but the question I was getting at was this: Supposing that project is not undertaken at the present at all; would your system take the cost of that preliminary work and put it into some other project which is now undertaken?

Secretary HITCHCOCK. No; I do not understand that.

Mr. KENNEDY. I did not either.

Secretary HITCHCOCK. I may be in error about that, but the director can tell you exactly how that is.

Mr. KENNEDY. That would await the development of that particular project?

Secretary HITCHCOCK. That is just what we are going to look into right now.

Mr. DWIGHT. That is to be the policy, that where you do know what it costs that is to be charged to that specific work?

Secretary HITCHCOCK. That is right.

Mr. DWIGHT. I think that is a fair proposition.

Mr. COOPER. It seems to me that the Secretary's view is correct, that if this land is not worth the price of irrigation, we had better not undertake it, and if—

The CHAIRMAN. The gentleman does not recall that before we took up this reclamation work we were expending about \$200,000 a year through the hydrographic division of the Geological Survey. That expenditure was never reimbursed. There was never any expectation of its being reimbursed and returned. We are saving the Government that much.

Secretary HITCHCOCK. I do not think that any part of the cost of that is charged to any part of this reclamation work, but we are taking advantage of the records in the bureau of the work that has been done.

Mr. COOPER. I would like to ask this question: Mr. Secretary, up to this time, has there been a demand for practically all the lands that are going to be irrigated under the projects undertaken?

Secretary HITCHCOCK. I can only answer that question by saying that a project is not undertaken until water users sign a bond to take up the land at the ascertained cost. Therefore I can only assume that it will all be taken up, and a great deal more, too.

Mr. COOPER. Do you mean that that includes the total acreage that is proposed to be irrigated by any project?

Secretary HITCHCOCK. That is right. That may not be the case in all cases, but there are enough water users signed up, as the expression is, to justify going ahead with the project.

The CHAIRMAN. That is not the case where there is a considerable amount of land in private ownership?

Secretary HITCHCOCK. With public land. Our information is that the moment we put water there, or come anywhere near it, there will be no trouble about getting the land taken up.

Mr. REEDER. It seems true that the Department has taken this view of the matter: That they are going to reimburse this fund for what is taken out of it. As long as we are on the cheapest projects in the United States I think that is very wise. Of course, if the question comes up later this committee or Congress will determine whether they want to continue this or not. But I want the Secretary to go from here with the impression, so far as I am concerned, that we are satisfied to have the fund kept intact. That is the only interest I have in this—to keep the fund intact.

Secretary HITCHCOCK. How do you mean intact?

Mr. REEDER. To keep as much coming back as is going out, regardless of how it is going out. If it is going out for a preliminary survey, let it be paid back by the settlers, and by that means permit no gradual leakage of this fund that will never come back.

Secretary HITCHCOCK. I should like to have an expression from the committee on that. I had to give my view of it, differing somewhat from that of the chairman. The point I want to get at now is: If these preliminary expenses, incident to each particular project, are not paid for or included in the cost of the project, we will have to stop right now, because we have no appropriation to pay for the preliminary expenses anywhere else.

Mr. KENNEDY. I want to go on record as favoring the present plan of charging the preliminary cost in each instance to the particular project.

Secretary HITCHCOCK. What I want to do is to keep our records clear.

The CHAIRMAN. I think that the chairman is alone on the committee in his view of that matter, and I simply make the statement because I feel that, while I am alone, I am right, and that, ultimately, we will come to that view of it; and I think it is the original view of the reclamation law.

Mr. REEDER. Maybe that is true.

Secretary HITCHCOCK. That is all right, Mr. Chairman—

The CHAIRMAN. I have no criticism to make of the Department at all. I was simply stating that as my view. This is true in regard to the matter you just referred to, Mr. Reeder, that there must of necessity be some of this fund that will never be returned unless you expect the Department at some future time to make a reckoning and take up the items on its books charged to projects never carried out and divide them among projects which are constructed.

Mr. DWIGHT. Admitting that some of this fund will never come back, yet the Secretary's plan makes it the minimum that is lost.

The CHAIRMAN. I understand that.

Mr. DWIGHT. Because he charges up to each project anything that he can properly charge to that particular project.

Secretary HITCHCOCK. Do not understand me for a moment as objecting to your plan. I am taking the cold view as to what the law requires us to do. The omission of that word "only" after the word "construction" leaves us no alternative, in my judgment, but to include whatever expenses are necessary in inaugurating and completing any one project.

The CHAIRMAN. I am in no wise criticising that view.

Secretary HITCHCOCK. We are open to criticism, and I invite criticism. Everything that we do should be criticised by Congress, if they have any criticism to make.

The CHAIRMAN. I would be foolish to criticise that view, inasmuch as I seem to be the only obstinate juryman. But, still, that is my view.

Secretary HITCHCOCK. I can see perfectly well how you take that view, under the discussion which you say took place in the original committee of seventeen, but we must be guided by the law.

Mr. DWIGHT. And the word "only" is not there.

Secretary HITCHCOCK. And the word "only" is not there, and the preliminary expenses are there. What are you going to do with those preliminary expenses? We have no appropriation from the Appropriations Committee to pay in any other way for those preliminary expenses than by charging them up to the reclamation fund.

The CHAIRMAN. Just one thing more. So far as those preliminary expenses are concerned on projects not undertaken, where you simply

make an examination with a view to determining whether a project is feasible or not, of course on your books you keep that cost as a separate item?

Secretary HITCHCOCK. That should be kept separate.

The CHAIRMAN. And you charge it to that particular project?

Secretary HITCHCOCK. For ultimate legislation, if necessary.

The CHAIRMAN. You would not divide that kind of a charge, at the present time, at least, among the projects which you do undertake? You would not be justified in that under the law?

Secretary HITCHCOCK. Of course the difficulty there would be in drawing the line, to say how much should go to the project accepted or adopted, and how much should not go to it.

The CHAIRMAN. I am speaking now of work clearly outside of your projects already undertaken.

Secretary HITCHCOCK. I think that that should be kept separate and should be charged necessarily against the reclamation fund, because we have no other place to charge it.

Mr. REEDER. All I have to say is to encourage you to keep right along on the line you are working in and if possible advance further, so as to make it impossible that this fund shall lose anything permanently.

Secretary HITCHCOCK. I understand that to be the chairman's idea. That is, his idea is to save from the reclamation fund for further and additional projects such charges as should not be charged to projects already accepted—getting the reclamation fund increased in that way. But the difficulty is to know where to draw the line and say, in the absence of that word "only," where we can put these expenses which may be not available for a particular project, but yet must be done to begin any project.

Mr. REEDER. My idea is that you are entirely wrong as to my position. My position is to encourage you to charge everything that you can to those lands that are irrigated, so as to have no money expended that is not coming back at once. That is the point I have in mind.

Secretary HITCHCOCK. If we can show a balance we would be very glad to turn it back to the Government. I am not in favor of spending every dollar because we have got it.

Mr. REEDER. I am in favor of fixing it in such a way that the people that get the use of the land will pay it back into the fund.

Secretary HITCHCOCK. They will do that.

Mr. REEDER. I think they will, too, if you will charge it to them.

The CHAIRMAN. Is it the desire of the committee to hear the Secretary further?

Mr. KENNEDY. I wanted to ask just a few questions. I notice, in the rather hurried examination that I have made of the report in our hands, that the land subject to irrigation is grouped largely with reference to projects. Now, to the uninitiated projects do not mean much; but I am receiving inquiries, and I presume other members of the committee are, with reference to the amount of irrigable lands in particular States and counties. Would it be practicable to get from the Reclamation Service a clean-cut, concise statement of the irrigable land in each State, and then by counties in that State, and then a statement of the amount of that land which is under projects?

I will explain to you the object of that. For instance, a constituent of mine from Nebraska wants to know how much irrigable land

there is in the State and where it lies. Unless you can point him to the particular county and the amount in the county you can not give him the definite information he seeks. And then, too, the next question he will ask is: "Is this under any project at the present time, and how soon am I likely to get water if I figure on taking land there?"

Secretary HITCHCOCK. Well, the answer to that is that any questions that you want to ask you have a perfect right to ask, and we shall have great pleasure in trying to answer them to the best of our ability.

Mr. KENNEDY. I was trying to see if we could not get a statement into the hearings—

Secretary HITCHCOCK. I think you can. Whether we can go into as much detail as you have stated, I do not know.

Mr. KENNEDY. You get my idea?

Secretary HITCHCOCK. I do, and shall be very glad to give it to you in as much detail as we can. We will answer it and reply just as much in detail as we can. But you will have to tell your inquirer that he had better not enter that land, because the Reclamation Service will withdraw it.

Mr. KENNEDY. No. Of course.

Secretary HITCHCOCK. It is your duty to answer those questions, and it is our duty to answer you.

Mr. KENNEDY. For instance—

Secretary HITCHCOCK. What I meant in the joking remark was this: Do not let your constituents overlook the fact that the land will be withdrawn if it is needed for reclamation purposes. We do that invariably. If we consider that a project should be undertaken, in order to prevent anybody's going to the expense of entering that land, it is withdrawn immediately. So do not let any of them do that on the strength of possibly becoming an owner of the land, because there is nothing paid for the withdrawal. They get no benefit from the withdrawal.

Mr. KENNEDY. I understand that. The point I wanted to get at was to be in a position to say to my people who inquire: "There are so many thousand acres in Nebraska subject to irrigation. That land lies in such and such counties, and there is so much of it that is now subject to present projects."

Secretary HITCHCOCK. The Hydrographic of Reclamation Bureau of the Geological Survey should be able to answer that question, and will do it if you will ask it.

The CHAIRMAN. I do not see how you could well answer a general question of that kind, Mr. Secretary.

Secretary HITCHCOCK. But here is a specific question with respect to a specific State.

The CHAIRMAN. You have only the one project in the State of Nebraska?

Secretary HITCHCOCK. Allow me to suggest, though, that I qualified my remark by saying that we would answer it just as far as our records go.

The CHAIRMAN. Yes.

Secretary HITCHCOCK. And of course Mr. Kennedy does not expect more.

The CHAIRMAN. You have only one project in Nebraska?

Secretary HITCHCOCK. That is right.

The CHAIRMAN. And you do not know anything about Nebraska outside of your project?

Mr. KENNEDY. Yes; I think the third report did show——

The CHAIRMAN. Some preliminary examinations; but certainly your preliminary examinations can not cover a State. For instance, you could not cover the State of Wyoming and develop the irrigable areas of Wyoming for less than \$500,000.

Mr. KENNEDY. We can get such information as the Service has.

The CHAIRMAN. You can tell them what irrigable areas there are under the projects that you have taken up.

Secretary HITCHCOCK. I think we can go further than that. I think the records of the office should show something more than the mere projects.

The CHAIRMAN. They have some general information.

Secretary HITCHCOCK. And as far as we have it, the Representative is entitled to it, and we will gladly furnish it.

The CHAIRMAN. But I hope, in view of the fact that we are going to charge up against the projects that are being constructed all preliminary examinations, that the Reclamation Service will not go far toward examinations beyond the borders of those projects that it has taken up. [Laughter.]

Is it the desire of the committee to hear the Secretary further?

Mr. KENNEDY. I think that for the present, at least, the committee has obtained the information it is seeking.

The CHAIRMAN. I suppose, Mr. Secretary, you can come again, if we give you notice, and if there are any particular matters about which we wish to question you?

Secretary HITCHCOCK. With very great pleasure, Mr. Chairman.

Mr. COOPER. If we want information about what is being done concerning any particular project or detail, it would be necessary to call upon Mr. Newell, Mr. Walcott, or some of those who are in charge of the work?

Secretary HITCHCOCK. Yes; but I would be glad to know what is going on myself, to keep in touch with it.

The CHAIRMAN. In my letter I suggested to you that we would like to hear from those gentlemen, and it was our thought to continue these hearings.

Secretary HITCHCOCK. By all means, I think they should be heard.

(After an informal discussion as to the time when the committee should reconvene:)

The CHAIRMAN. Then, if the committee does not desire to hear the Secretary further at this time, we will meet to-morrow morning and hear Mr. Walcott.

Mr. COOPER. Is there any particular branch of the subject that he will take up?

The CHAIRMAN. Any matters that the members of the committee wish to take up.

Secretary HITCHCOCK. There may be some matters that he can give more in detail than I have been able to give them to you.

The CHAIRMAN. I think we shall probably want to hear you again, Mr. Secretary, on points that may come out during the hearings.

• Secretary HITCHCOCK. I shall be very glad to attend at any time.

The CHAIRMAN. We are very much obliged to you for appearing before the committee.

(Thereupon the committee adjourned until to-morrow, April 17, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Tuesday, April 17, 1906.

The committee met at 10.30 o'clock a. m.

Present: Representatives Mondell (chairman), Reeder, Cooper, and Kennedy.

The CHAIRMAN. Mr. Newell, chief engineer of the Reclamation Service, is here this morning, and he has suggested that inasmuch as Mr. Savage, who has charge of the work in Montana, North Dakota, and northern Wyoming, is here and expects to leave to-morrow, it might be well for us to hear him in regard to the work of which he has charge. That is your wish, is it, Mr. Newell?

Mr. NEWELL. Yes.

The CHAIRMAN. In that case we will be very glad to hear from Mr. Savage with regard to the progress of the work under his immediate charge.

**STATEMENT OF H. N. SAVAGE, ESQ., SUPERVISING ENGINEER,
RECLAMATION SERVICE.**

Mr. SAVAGE. Mr. Chairman and gentlemen, as to the project under my immediate supervision, of which you gentlemen have perhaps the most knowledge—some of you, at least, having visited it last summer; the Shoshone project—contracts have been awarded for constructing the Shoshone dam, which is to be the highest dam in the world—305 feet from lowest foundation to top. The first year's work consists in the construction of a temporary diverting dam, a flume, a discharge tunnel around the side of the dam through the ledge rock, which will be the permanent outlet of the storage reservoir, and a flume extension from that downstream, all of which works combined will carry the water during the winter season past the site of the dam, to permit excavation and construction.

The excavation at this site will have to be carried down 62½ feet below the stream bed to get down to solid bed rock. Extensive diamond-drill borings were made all over the immediate canyon site, and the place narrowest and shallowest selected for the dam site.

The canyon at this site has a width at stream bed of 65 feet, and at the top of the dam it has a width across of only 155 feet. The contractors began work in September. Owing to difficulty of getting machinery and plant, the work has been progressing very slowly, and the contractors are now sixty days behind their schedule progress time. They have a temporary dam completed about 25 feet high and 400 feet long. They have a flume completed down to the tunnel. They have the tunnel driven, and are now beginning lining operations, and hope to get the work into condition by the time the big flood reaches there, which will be in a week or ten days, according to its usual seasonal period.

They are also making arrangements to crush the rock and the sand (we have to make sand there; there is none available) from their excavations for the spillway and spillway tunnel. They are moving in a plant at this time for the excavation of the site for the dam. That will consist of two Ridgewood cable conveyors. The material conveyed will be crushed for crushed rock and also sand, the structure being built of concrete. Everything there has to be carried on in the winter time; the flood is so great and so long through the summer that no works that we can build can handle it; so we do temporary work in the summer, and then, when the flood drops to 2,000 second-feet, these temporary works will carry it. Then we get in and excavate and house the canyon in entirety; we build a building to hold the entire canyon, with doors, and then this concrete structural work can be put in, the materials being put in through chutes down to the site, mixed, and a concrete dam made.

The CHAIRMAN. How early in the fall do you expect they will be able to begin excavation?

Mr. SAVAGE. According to the past records, it will be between the 15th of August and the 1st of September before the stream will probably drop to 2,000 second-feet, and that is the capacity of these temporary works designed and now nearly built. They will have from that time until about the last of December to do the excavating, and then from then up until about the 1st of May to do the construction; and then they will have to lay off construction work, having by contract-schedule progress gotten the base up to the stream level. Then the flood will go over the entire affair.

The CHAIRMAN. That dam is of solid concrete?

Mr. SAVAGE. Solid concrete.

The CHAIRMAN. What is the largest rock that goes into that concrete?

Mr. SAVAGE. The concrete is made of crushed rock, the largest piece that will pass through a 2½-inch circle. Then the sand is crushed to have a minimum per cent of voids to save cement; and then, in that concrete we permit the embedding of what is known as one-man rock, rock that one man can handle; no two pieces of rock can be in contact with each other, or in contact with the outside, to save expense. The rock there for that work is as fine as can be had in the United States. It is the very best of granite.

Mr. COOPER. That would make a construction similar to conglomerate rock?

Mr. SAVAGE. It would be.

Mr. KENNEDY. What do you mean by 2,000 second-feet?

Mr. SAVAGE. In this case we mean a body of water 10 feet wide and 10 feet high with a velocity of 20 feet distance per second.

The CHAIRMAN. You mean a body of water of a volume of 2,000 cubic feet passing a given point each second, in other words?

Mr. SAVAGE. No.

Mr. KENNEDY. No; 20 feet progress—

Mr. SAVAGE. One hundred cubic feet of water passing at the rate of 20 feet in a second.

The CHAIRMAN. Yes; passing 20 feet in a second, or 2,000 cubic feet passing 1 foot in a second.

Mr. SAVAGE. Yes.

Mr. NEWELL. Passing a point.

Mr. SAVAGE. To answer the question I will give the exact section of our flume, so that it will convey the exact idea.

Now, as to the work at Corbett tunnel: This water, after being impounded in this reservoir—and, by the way, that reservoir is designed to control the entire discharge of the Shoshone River, both the north and south forks—is discharged down the river for 16 miles and there diverted by the diverting dam and a tunnel, the tunnel being $3\frac{1}{2}$ miles long, out onto the flat land.

Mr. COOPER. You say you divert it after you dam it up; you run it down the bed of the river, you say, for 16 miles?

Mr. SAVAGE. Yes, sir. This [indicating on map] is the diversion tunnel as now constructed. The temporary dam is here, a thousand feet above. That is completed. The flume to here is completed. This is now being lined, and a flume extension will go in. Then this dam will be built. After that this water that is diverted will be turned loose here, and run down this river from this site to a point 16 miles below, where it will be diverted by a low dam and go through a tunnel $3\frac{1}{2}$ miles long, and will then be taken onto this land. The possibilities of that project are two low diversions onto the lower lands and one high diversion; and, if desired, ultimately another high diversion on the other side on the lands south and east of the town of Cody.

Mr. REEDER. This is Cody here [indicating]?

Mr. SAVAGE. That is Cody. The first object is to get a small portion of the land under irrigation in the shortest possible time; and that could be done in here, as when that tunnel is built the water will be applied from the mouth of it onto the next distance. The tunnel work has proved to be, as was expected, extremely easy of excavation. It is sandstone and shale, and can be easily bored with augers.

The CHAIRMAN. You are speaking now of the Corbett tunnel?

Mr. SAVAGE. Of the Corbett tunnel. We have left the Corbett dam. They have an air plant, and are able to drive their augers actuated by air 6 feet in a minute, which makes work very rapid. The material so far has been standing fairly well, although they are putting in timbers and it is beginning in some places to break down a little.

The CHAIRMAN. How far have they driven?

Mr. SAVAGE. They have driven a total of only about 1,000 feet.

The CHAIRMAN. From how many adits?

Mr. SAVAGE. From practically two adits and four headings. They have opportunity for a total of seven headings, and are going to put those all into commission at once now. They have been delaying their work to use some machines that they had designed to do all the tunnel excavating, the digging, and the loading into cars. Those machines theoretically were possible, and practically they are probably impossible. They have two machines there now that they are using for mucking, both of which are not satisfactory. They have delayed their work for six months in order to use these machines, and now are just realizing that they have gotten so far along with their period that they will have to work every heading possible, and they are beginning to do so.

The CHAIRMAN. Up to this time has any sort of a mucking machine for handling material in a tunnel been successful?

Mr. SAVAGE. There have been about 250 machines patented, and about as many more built and not patented, none of which, so far as I know, have proved reasonably practicable for tunnel digging or mucking.

The CHAIRMAN. Further than the use of a small steam shovel, possibly.

Mr. SAVAGE. They have at work there at Corbett at the present time and also at our work in Montrose two machines known as "Park loaders." They consist of an inclined frame with an endless belt, with small cams attached to this belt that run around and take up material and take it up on to a belt conveyer, which runs it out and drops it out into a car. In actual operation it works very nicely; but getting the thing into commission and out of commission and getting the air applied to it, etc., has so far not proven particularly economical.

The CHAIRMAN. Getting it back from the shops and out again, and so on?

Mr. SAVAGE. Yes. The tunnel work in that case can probably be done as cheaply by hand as by any other method; but it is not, of course, fast, and in order to make progress they are trying to use some machinery.

Mr. KENNEDY. Mr. Savage, what will be the permanent lining of the tunnel?

Mr. SAVAGE. The permanent lining of that tunnel will be of concrete 9 inches thick, entirely around; and if the material on top proves to be very loose, that thickness on top will be increased at the arch from 9 to perhaps 12 inches; timbers will be put in if the material is loose, and then, if they can be taken out when the lining is done, they will be. Otherwise they will be left in, the concrete being put in in large enough section not to interfere with the net thickness of the concrete lining.

The CHAIRMAN. Do you contemplate a general timbering or lining with timber of the tunnel at any point?

Mr. SAVAGE. We anticipated that that might be necessary, and have provided the timber, and it is being put in at some places already; and it is likely that there will have to be a total of a few thousand feet, perhaps, out of that 17,000-foot tunnel timbered.

The next work there will be the award of concrete for the Gowan Canal, which is an extension of this tunnel. That tunnel, by the way, has a capacity of 1,000 cubic feet per second, a cross section of 100 square feet, and a velocity of 10 feet per second. This Gowan Canal will have an ultimate length of about 70 miles. The greater portion of the first section of 7 miles has already been advertised, and bids will be opened in Billings on May 24.

The CHAIRMAN. How many miles are there of the Gowan Canal?

Mr. SAVAGE. Seven. That has been cut up into very small divisions in the hope that we may get local bidders that can handle that small work. That canal will have a maximum width of 40 feet on the bottom and a carrying depth of water of $6\frac{1}{2}$ feet; and where rock is encountered it will have a lesser area and a greater slope and, therefore, greater velocity.

There will be a diverting dam at Corbett that will be sent to advertisement in a few days. That will be a concrete steel reinforced structure in the general form of an open A, with a long apron down-

stream. That has to take the overflow of these floods. That dam will be 12 feet high, and 400 feet of it will be overflowed, and then there will be a big embankment the balance of the way across the stream, the embankment having a total length of about 600 feet.

Mr. REEDER. Mr. Savage, do I understand that you do not purpose building a dam that will control the flood?

Mr. SAVAGE. Not at Cody. The Corbett dam regulates the entire discharge of the Shoshone River.

The CHAIRMAN. The Cody dam regulates the entire discharge?

Mr. SAVAGE. Yes.

The CHAIRMAN. You said the Corbett dam.

Mr. SAVAGE. Oh, the Corbett dam does not; that only diverts. I refer to the Shoshone dam—the Cody dam, as you call it.

The CHAIRMAN. "Shoshone" is the proper term.

Mr. SAVAGE. That regulates the entire flow.

Mr. REEDER. That is a few miles above Cody?

Mr. SAVAGE. That is 8 miles above Cody. That is the site that you visited. This other one you did not visit. It is just a little, low diverting dam.

Mr. REEDER. But that will control the whole flow, so that the floods will be taken care of?

Mr. SAVAGE. Yes, sir; that will not store the entire run-off, but it will so regulate it that we will have the entire run-off available during the entire irrigation season.

Mr. REEDER. I see.

Mr. SAVAGE. The run-off from the Shoshone River is upward of a million acre-feet. The capacity of the Shoshone reservoir is about 400,000 acre-feet, but there is a peak up there, you know. The irrigation season begins before the peak and extends after it, so we catch that peak and store it so that we can continue it just as we want it.

Mr. REEDER. You use it all?

Mr. SAVAGE. We use it all.

Mr. KENNEDY. Do you mean by "4,000 acre feet" enough water to cover 4,000 acres a foot deep?

Mr. SAVAGE. The capacity of the reservoir is 400,000 acre feet; and by the expression "4,000 acre feet" we mean sufficient water to cover 4,000 acres 1 foot in depth.

Mr. KENNEDY. Yes; that is what I thought.

Mr. SAVAGE. In this case, however, the duty of that water will probably be in the vicinity of 3 acre feet per acre in the reservoir.

Mr. KENNEDY. You will have three times the capacity?

Mr. SAVAGE. No; we will have water in the reservoir for about one-third as many acres of land as the total discharge of the river. If the river discharges a million acre feet, we can probably irrigate safely about a third of a million acres of land.

Mr. KENNEDY. I see.

Mr. SAVAGE. It is expected to send to advertisement immediately the distribution system for the first 28,000 acres of land in the vicinity of Gowan, and additional land will be put under irrigation as fast as practicable.

Mr. REEDER. How many acres of land did you say?

Mr. SAVAGE. About 28,000 will be included in the first contract, and additional land will be irrigated as fast as practicable.

The CHAIRMAN. The 7 miles, you say, that you have asked for bids on, cover 28,000 feet?

Mr. SAVAGE. The 7 miles carries the water down to the controlling parts of this 28,000 acres. From there we can put in this lateral system all over, and then the big canal will be continued to Fanning in time, as required.

The next project that you gentlemen saw in your last summer's trip there was the Huntley project.

Mr. REEDER. Will any of this land be irrigated for crops this season?

Mr. SAVAGE. No, sir; it is hoped to get some of it irrigated for crops next season.

The CHAIRMAN. Have you gotten far enough along so that you have an idea as to when you will probably carry out the north side high-line canal and tunnel?

Mr. SAVAGE. That will depend very largely on the policy of the reclamation service, as determined by the "powers that be" as to how much money can be had for that project. It seemed necessary and wise to get some land under irrigation at the earliest possible moment, and that was done. The next thing after that might be either the south side adjacent low-line or this high-line canal at the left. Either one of those can be taken up just as soon as it is decided wise to put in that money at that place.

Mr. COOPER. What would it cost to irrigate this land on the Shoshone project, Mr. Savage?

Mr. SAVAGE. It has been intimated that the cost of that work, for the irrigation of the lands reasonably tributary to that reservoir, will be about \$30 per acre. Those costs, as you of course realize, and all of us rather more than formerly, are quite subject to changes in cost of earthworks and contractors letting go and haying to readvertise and relet at different prices.

Mr. COOPER. How many acres do you figure in your estimate as being reasonably within the scope of this project?

Mr. SAVAGE. There are tributary to that work, very close to it, 120,000 acres; and there are large additional areas immediately surrounding those that are directly tributary that can be included, if desired. This 120,000-acre tract is largely low lying and close in. The Gowan Canal will irrigate about 80,000 acres. On the south side adjoining are 25,000 acres of particularly good-lying land. Under this high-line canal that Mr. Mondell speaks of, from the left, taking the supply directly from the reservoir by tunnel and canal, there are 40,000 acres of very good land.

Mr. COOPER. How much of a tunnel would you have to make there in order to reach up to the high level?

Mr. SAVAGE. There will have to be a total of $3\frac{1}{2}$ miles of canyon work, which is practically parallel with the road that you went over through the canyon; and that work will be all in rock section, and practically the same work as in tunnels; some in tunnel and some built up on the outside of that talus slope. It will be about a mile and a half of tunnel work and a mile and a half of outside rock-section built-up work. It is not especially expensive; still, it is expensive work as a whole, compared to outside earth work.

The CHAIRMAN. In your estimate of 80,000 acres as being under the

Gowan Canal do you include the extreme extension of that canal to Freny?

Mr. SAVAGE. Yes, sir.

The Huntley work, that you gentlemen saw, 12 miles below Billings, is well under construction at the present time. Five contractors and a number of subcontractors are pushing the work energetically. We had great difficulty in placing the contracts for that work. Bids were received May 28, 1905, and the work was awarded three successive times before getting a contractor to execute the contract; and finally a portion of it was readvertised. It is all now under construction, with the exception of one short division. That will irrigate about 30,000 acres of land, and it is expected that water will be available for the irrigation of this land some time in the season of 1907. The tract is particularly well located and favorably situated in all ways for small unit areas. The tract is traversed by two transcontinental railroads, and the railroad companies are cooperating to the end of establishing towns at 5-mile intervals throughout the tract on each railroad. It is expected that in addition to the usual staple crop of alfalfa, sugar beets can be and will be very extensively grown. A sugar-beet factory is already under construction at Billings, 12 miles away.

The CHAIRMAN. What did you say the area was?

Mr. SAVAGE. About 30,000 acres.

The CHAIRMAN. And you hope to irrigate some portion of that area next year?

Mr. SAVAGE. We hope to get some water on it some time during the season of 1907.

Mr. COOPER. About what proportion of that land will be Government land?

Mr. SAVAGE. That land is all within the ceded portion of the Crow Reservation, and there are about 3,000 acres out of the total 30,000 that have been allotted to Indians. Otherwise it is entirely Government land.

That project, because of the opportunities for small unit acreage farms, is attracting a great deal of attention; and a canvass of the country about Billings has brought out the fact that there are to-day within 5 miles of Billings 128 successful farmers who are tilling not to exceed 40 acres of irrigated land each.

The CHAIRMAN. What do you propose to make the farm unit?

Mr. SAVAGE. It is proposed at this time to recommend that the farm units contain not less than 40 acres of good irrigable land. That will include, in a good many instances, perhaps a total of 60 acres of good irrigable land as the subdivisions require—the railroads and the fractional sections, etc.

The CHAIRMAN. You contemplate, then, the possibility of a subdivision of 40's?

Mr. SAVAGE. Yes, sir.

The CHAIRMAN. Mr. Newell, will you require legislation when you reach the point where it is necessary to subdivide the 40's?

Mr. NEWELL. On the usual Government lands the Department will not allow any subdivision outside of the 40's, excepting in the case of lots.

The CHAIRMAN. Yes.

Mr. NEWELL. This tract contains a great many lots, owing to the meander line of the river and the way in which the two railroads cut the tract, so that there will be a great many irregular-shaped lots there.

The CHAIRMAN. Yes; but when the railroad simply cuts the tract, under the present law, as I understand it, they can not divide those areas; but clearly they ought to be divided.

Mr. NEWELL. They should be divided; and I think there should be some legislation which will permit it.

The CHAIRMAN. As I understand—and I think that is the law—the Land Office has no authority to allow the entry of anything less than a legal subdivision. Of course, the smallest legal subdivision is 40 acres, unless there may be a lot subdivision, which is smaller than that; and it occurred to me that in a case of that kind, where you might want to go below an 80 and still allow an entry larger than a 40, it might be necessary to have some legislation.

Mr. NEWELL. It should be done.

Mr. SAVAGE. Mr. Mondell's point is very well taken indeed, particularly as it refers to 40's that are divided by a railroad running across them. According to the law as it has been interpreted to the engineers in the field, we are not permitted to subdivide that 40, but must give a man a part of his land on one side of the track and a part on the other; and it is a very expensive matter and also a dangerous one.

Mr. KENNEDY. Mr. Savage, is that land so broken up that part of a given 40 or 80 would be too rough or high to be irrigable, while the majority of it would be level and subject to irrigation?

Mr. SAVAGE. The land as a whole lies very well; but there are some cases where there are sloughs in the lower part and draws through it, but not much hilly land.

Mr. KENNEDY. So that in some instances a man might be entitled to 80 acres, 40 or more of which would be subject to irrigation and the balance not subject to irrigation?

Mr. SAVAGE. In perhaps a majority of the cases he will get more than 40 acres of good, irrigable land, because we will make that the minimum area.

Mr. KENNEDY. You mean more than 40 out of 80?

Mr. SAVAGE. Yes, sir.

The CHAIRMAN. Have you taken up with the Land Office the question of descriptions, Mr. Newell, in a case of that kind? For instance, clearly you do not want to give a man an entry on both sides of the Northern Pacific Railroad with a 400-foot right of way running through his farm. Now, if the farm was not to be irrigated, it would not be, possibly, a matter of any considerable importance, providing there were crossings; but where you are dividing the land into small tracts and it is under irrigation, it would practically be impossible for a farmer to irrigate on both sides of the railroad. It seems to me that unless there is some legislation, or some new rules and regulations in the Department, whereby those entries can be allowed, when you get ready for those entries you may have difficulty.

Mr. NEWELL. The rule adopted so far has been to make what we call farm units—that is to say, subdivide the sections and quarter-sections into units of 40, 80, or 120 acres, and include enough 40's to give a man at least 40 acres of irrigable land. That is, he may have

three 40's, and out of those three 40's he may not get more than 80 acres. Now, one of those 40's may run over and embrace land on the far side of the railroad. For all practical purposes that land is worthless to him, because he may not be able to get water to it at all. Nevertheless, that is counted against him, and works to that extent a hardship on him, and reduces the revenue of the project. So that I think latitude should be given us to make those farm units to conform, not necessarily at all times to the legal subdivision, but to subdivide the smallest legal subdivision into at least 10-acre units.

THE CHAIRMAN. It seems to me that it is necessary where you have, as you have here, a railroad, and further than that, where in many instances your main-line laterals will run diagonally through a forty, a man irrigating from a given lateral would be very greatly inconvenienced if his water were from two sources, one portion of it from a lateral running through his farm and another from laterals coming down from a higher canal; and that in that case you might want to subdivide along the line of a lateral. Under the present law and practice I know of no way in which you could describe that sort of a subdivision. Neither do I know of any way in which you could describe the subdivisions of a forty that might lie on both sides of a railroad. It seems to me, therefore, that if you contemplate such division, and further than that, if you contemplate in some cases the division of unbroken forties (the idea being to give a man, possibly, 60 acres in order that he may have 40 acres of good land, and the man next to him 60, requiring the division of the forty), you would have to have legislation even to do that, in order to describe in a deed the north half or the south half or the east half or the west half of the northwest quarter of the northwest quarter, we will say.

MR. NEWELL. I think the well-established practice in the Land Office in such cases is to allow a description by metes and bounds. For example, in the Imperial country there are two surveys overlapping by about a mile in one direction and half a mile in another. The result is that although both of those surveys are on the rectangular system, the Land Office has allowed that land to be described by metes and bounds; and it seems to be quite well recognized in a number of cases of conflicting surveys.

THE CHAIRMAN. In that case, Mr. Newell, Congress has authorized a resurvey. There is a law governing in that particular case. We have authorized in the Imperial Valley a land resurvey describing the land by metes and bounds. But that has been under a law governing that condition; and my inquiry was simply to bring out whether or no you have conferred with the Land Office as to the possible necessity of legislation allowing you to further subdivide.

MR. KENNEDY. On practicable lines?

THE CHAIRMAN. Yes. I will not take any more of your time, Mr. Savage.

MR. SAVAGE. I want to thank you for bringing that out, Mr. Mondell, because that has been one of the obstacles we have had in trying to handle that land in a practical way—to get a man's entire farm on one side of a railroad track when were there two eighties, instead of having a railroad run through each man's farm, to have each man have his entire farm on one side of it.

THE CHAIRMAN. As a suggestion, Mr. Newell, it seems to me that in order to accomplish this it will be necessary for the Land Office to

designate some of your people as deputy surveyors to make further subdivisions, and to have those further subdivisions entered upon the plats of the Land Office as regular subdivisions, so that when entries are made they can be made in accordance with those subdivisions.

Mr. COOPER. Is it your judgment, then, Mr. Chairman, that it will be necessary to have some additional legislation in order to meet these difficulties that Mr. Savage has just been speaking about, on account of lands lying on both sides of a railroad or stream—some division of that kind?

The CHAIRMAN. I think legislation would be necessary unless they do this (this occurred to me as a way that you can meet it without legislation): The Land Office has authority to describe Government land in small areas where there is any necessity for it. In the general rectangular surveys the land is not sufficiently subdivided so that they can describe it in smaller tracts than 40 acres; but they have authority to further subdivide where any necessity exists.

In carrying on the work of the General Land Office the necessity of further subdividing has not existed under our general land laws, except where they meander a stream. There they divide into lots and further subdivide in that way; or on the closing lines of their surveys, where the area of the remaining tracts on the closing lines on the north and west sides of a township is less than 160 acres, or there is a fraction, they call those tracts "lots." Now, under the law it seems to me that they could authorize you, as deputies of their office, to further subdivide these tracts as you found it necessary to tie that further subdivision into the survey and to file that further subdivision as supplemental to the survey already made. Then the entries could be made in accordance with those subdivisions, and I think that could be accomplished without further legislation.

Mr. Savage, you must excuse me for taking your time.

Mr. SAVAGE. I am very glad to have your assistance, Mr. Chairman.

The next project well under construction in the general northern country is the lower Yellowstone. This contemplates the irrigation of 67,000 acres of land along the left, or west, side of the Yellowstone River from a canal diverting 17 miles below Glendive and running 80 miles to the Missouri River. Contracts were awarded for this work during the year 1905, and owing to changes in conditions, increase of work, increase of prices, etc., all the earthwork contractors have either defaulted or been forced into insolvency. Readvertisement has been made and bids were opened at Glendive on April 12 for portions of the work, and an award has been recommended on two or three of these readvertised sections. No bids were received on portions of the larger work, both earthwork and structures. Effort is being made at this time to subcontract the work if authority can be gotten, and if not it may be inevitable to start force-account work in order that the entire canal may be constructed at a given time, in view of the delays and apparent inevitably greatly enhanced cost of getting work done when there are no bidders who want it.

The project contemplates the irrigation at first of 28,000 acres, and this area will be extended by additional contracts as rapidly as practicable to award them and get the work done. The canal has a capacity of 850 second-feet where it diverts from the river, with a bottom width of about 30 feet. The fall of the river is very slight, and much difficulty has been found in locating this canal and getting

it on to land where it can be economically constructed because of the topography. There will also be necessary a diverting dam across the river 12 feet in height, with a total length of 600 feet. Bids have been asked for this work to be opened May 10. The work on the head-works masonry construction is well under way and on several of the structures throughout the canal line, but no bids have been received for the structures on the last half of the canal line or any of the lateral streams. This is the work that has been referred to as probably necessary to do by force account.

Mr. KENNEDY. Have you asked for bids on that work?

Mr. SAVAGE. We have asked for bids, and have received no bids for the aggregate of \$200,000 worth of earthwork and \$200,000 worth of structural reinforced concrete work. We also have defaulted one of the divisions that aggregates at this time about \$100,000 or unfinished work that is in the same condition.

The CHAIRMAN. You say you received no tenders at all on your last advertisement?

Mr. SAVAGE. None whatever on one of the divisions. We received tenders on two of the divisions that were largely team work.

The CHAIRMAN. And what was the character of the other work?

Mr. SAVAGE. The character of the other work is more difficult and heavier work, and it is thought to be more difficult material to handle.

The CHAIRMAN. Will that require the use of heavy machinery?

Mr. SAVAGE. It will. Division 3, for which no bids were received, will require heavy machinery, either steam shovels and cars or else some form of clamshell bucket machinery; and about the same type of machinery will also be required on division 2 of the work that has been awarded, but it is not considered quite such difficult work to handle—not quite such difficult material.

The CHAIRMAN. What is division 3—heavy cutting?

Mr. SAVAGE. Yes; division 3 will be heavy cutting, and a good deal of it is pretty deep furrow cuts.

The CHAIRMAN. Have you advertised that more than once?

Mr. SAVAGE. That was advertised and awarded and the contractors forfeited their bonds by neglecting to begin work. It was readvertised and bids were asked for opening April 12, and no bids were received.

Mr. KENNEDY. Mr. Savage, have you had the question tested as to just what the Government's remedy is on the bond? Do you contend that the Government can recover the amount of the bond, or that the bond is simply a protection to the extent of the actual loss sustained by the Government?

Mr. SAVAGE. I am informed by the legal fraternity that the Government may recover to the extent of the bond, provided the increased cost to the Government for constructing the work equals the cost of the bond or more.

Mr. KENNEDY. In other words, your remedy is limited to the actual damage sustained, within the bond?

Mr. SAVAGE. Yes, sir; that is my general understanding. For example, in the case of the last half of this main canal it was apparently thought by the bondsmen that the work could be done for the contract price, and less than the contract price and the total bond; and they have arranged with the new contractor (an old contractor

of the North) to carry out that work for them, expecting that they will be able to save part of the bond. That is as I understand their negotiations from the contractor to whom they have awarded this new work. We also have on this division 1, which was forfeited by that same company, an independent bondsman, and so far as he has seemed to indicate by his actions that he feels that the cost of that work will be more than the price bid and his bond; so he apparently expects to forfeit his bond if he is compelled to do so.

The CHAIRMAN. How heavy is his bond?

Mr. SAVAGE. His bond is only \$10,000, with \$100,000 worth of work to complete.

Mr. KENNEDY. Now, Mr. Savage, is it not true that the contractor would be liable on his contract, even beyond the penalty in the bond, for any loss which the Government might sustain in excess of the amount of the bond?

Mr. SAVAGE. That might be; but so far, when we got to that point, we have found that our contractors were not responsible for anything, as a matter of fact.

Mr. KENNEDY. I presume that is true.

The CHAIRMAN. You speak of the bond in this case. Do you refer to the preliminary sum deposited with the tender?

Mr. SAVAGE. No, sir.

The CHAIRMAN. You actually entered into a contract in this case, did you?

Mr. SAVAGE. With all tenders a certified check for a certain amount is deposited as a guaranty that the contractor, if awarded the contract, will execute it.

The CHAIRMAN. Yes.

Mr. SAVAGE. We also have, with each of our specifications, the guaranty of responsible sureties that if an award be made to the bidder they will execute bonds in the amount specified, usually 40 to 50 per cent of the total amount of the contract, to insure the faithful completion of the work by that contractor.

The CHAIRMAN. Do you require that with the tender?

Mr. SAVAGE. We do. We had a number of cases where, after putting in the bid, the contractor wanted from thirty to sixty or ninety or a hundred and twenty days in which to go around among his friends and get sureties; and to save the Government that delay we put that in the advertisement.

The CHAIRMAN. In the case of the contractor for the Pathfinder dam, was there any such guaranty or bond? My understanding was that all that the contractor forfeited was the amount that he deposited with his tender.

Mr. SAVAGE. That understanding is in accordance with my own—that the surety had not legally obligated himself, according to the interpretation of the lawyers.

The CHAIRMAN. Did you have the form of guaranty bond that you now have at that time, Mr. Newell?

Mr. NEWELL. No; I think not. That is a later edition.

Mr. SAVAGE. I have to plead to initiating that form of guaranty there, having been a contractor's engineer before and being caught by that at one time. One of the sureties with whom I was connected was forced to complete a work amounting to something over half a

million dollars, because of having guaranteed a bond of another department of the Government; and it seemed to me that it was only just to the United States to protect itself against delay and neglect of the contractor by insisting on that bond being authoritatively given and responsibly given at the same time that the bid was put in.

The CHAIRMAN. I notice here that this guaranty bond is in the sum of 20 per cent of the contract price.

Mr. SAVAGE. Yes.

The CHAIRMAN. That is the amount that you require now in all cases, is it, Mr. Newell?

Mr. NEWELL. That varies in the different cases. In some cases we put in a flat amount, a certain number of thousand dollars. For instance, in the case of the delivery of cement, where the work is completed and can be paid for, there is no need of having a great, big bond; whereas in other work, the completion of which is essential, a large bond and a large holdback are required.

The CHAIRMAN. I assume that in no case do you make the bond more than 20 per cent of the contract price, in view of the fact that this guaranty is only 20 per cent of the contract price?

Mr. NEWELL. Yes; as a rule it is not higher than 20 per cent. It may be considerably less.

Mr. SAVAGE. Mr. Chairman, the bond and the guaranty are the same thing.

The CHAIRMAN. I assumed that the bond, when executed, would be in accordance with the terms of the guaranty.

Mr. SAVAGE. Yes.

The CHAIRMAN. And I notice that the guaranty has a maximum of 20 per cent.

Mr. SAVAGE. Yes; in that particular case.

Mr. COOPER. You would use this instead of a certified check, would you not?

Mr. SAVAGE. No; we exact the certified check first from the bidder. That is in the advertisement.

Mr. KENNEDY. Then, when he is awarded the bid, you call for the guaranty?

Mr. SAVAGE. He puts in, also, the guaranty of people who are going on his surety; and then, when he signs the contract, the certified check is returned to him. On the earthwork contracts, the dam contracts that we are now entering into, the bond required is in the vicinity of 40 per cent. We have a number of these bonds for 20 per cent that are being forfeited. For instance, in the case of this work that we are speaking of in Division 1 of the lower Yellowstone there was a bond of \$10,000, and that has been forfeited. We have one of \$10,000 on the Huntley division, where the total contract aggregated only \$56,000. That bond for \$10,000 apparently may be forfeited.

Mr. COOPER. Why do you not stipulate in the advertisement that this check for \$10,000 shall be forfeited and payable as liquidated damages for failure to enter into the contract?

Mr. KENNEDY. It would not make much difference, out in our country, whether you did that or not.

Mr. COOPER. The courts do not look with favor upon a penalty?

Mr. KENNEDY. No; only the actual loss.

Mr. COOPER. This is a little different from the case of the actual loss.

Mr. KENNEDY. The courts do not enforce that rule very strictly, however.

The CHAIRMAN. You have had no difficulty with any of the contractors, where they have failed to enter into a contract, in retaining the certified check, have you?

Mr. NEWELL. The check has been deposited in the Treasury to the credit of the reclamation fund in certain cases.

The CHAIRMAN. In how many cases has that occurred; more than the Pathfinder case?

Mr. NEWELL. I think there are about four cases; four or five.

The CHAIRMAN. In any of those cases have the contractors sued you, or made any claim for the check?

Mr. NEWELL. Not legally. They have come and importuned us, and tried to show special cause.

Mr. KENNEDY. I do not believe the Government would have any trouble in retaining the check.

Mr. COOPER. Suppose the contract was advertised the second time and was let for a less sum than the first time; how could you retain it then? You could not show any damage.

Mr. KENNEDY. Because in that case they will enforce it if it is stipulated as liquidated damages.

Mr. SAVAGE. I beg your pardon; Mr. Cooper's statement was if they let it at a less price. That is a contingency that we have not met.

Mr. COOPER. Then you have no damage, according to your idea?

Mr. KENNEDY. According to the rule as I understand it, and I have been through it in the Federal court, if a check is given in support of a bid and it is stipulated that that is to be forfeited, the conditions there are so indefinite that the court will enforce that forfeiture regardless of whether the loss is greater to the Government or whether it is less. But when you come to enforce a bond given for the faithful performance of a contract, the courts get down to the question of actual loss.

Mr. COOPER. That is the reason I suggested in this instance, when this check for \$10,000 (or whatever other sum might be named) was put up to guarantee that the party would enter into the contract, that it shall be stipulated that that should be forfeited as liquidated damages.

Mr. KENNEDY. It is all right about the check; but as a rule the check is not for that amount.

Mr. COOPER. No, no; but whatever sum it is, if it is stipulated at the time that that shall be forfeited as liquidated damages for his failure to enter into the contract, I do not believe he could recover it back, no matter what the circumstances were.

Mr. KENNEDY. No; not as to the check.

Mr. COOPER. No; but on the failure to carry out the contract. The bond is only given as a guaranty that the party will carry out his contract faithfully.

Mr. KENNEDY. That is right.

Mr. COOPER. And they can not recover the whole bond. It will only be what the damage was.

Mr. SAVAGE. The Milk River situation, with its international complications, has been brought to a point where it has been decided to go on and do business first and explain afterwards. Negotiations have been pending for several years between the United States

and our Canadian friends on the north regarding the adjudication of the waters of St. Mary Lake and the Milk River. The Canadians, meantime, have constructed ditches and have been increasing the application of water from the St. Mary to land up in the British possessions, and it has been decided recently to begin the construction of works to conduct the water of St. Mary drainage to the Milk River, or if by the time those works are completed it has not been practicable to arrange satisfactory terms with the Canadians, to use those waters on lands in the easterly portion of the Blackfeet Indian Reservation and lands adjacent thereto. It is now proposed to begin construction at once on a canal, with a capacity of 850 cubic feet per second, 23.7 miles long, from the foot of St. Mary Lakes to the South Fork of the Milk River.

(At this point Mr. Savage explained, by reference to the map, the location of the projects above referred to.)

The CHAIRMAN. Your present determination is not to allow the water to get into Canada? Is that it?

Mr. SAVAGE. The present operation contemplates the diversion of the water that now runs down the St. Marys and goes into Hudson Bay. We want to divert it into the Milk River, where it will come back into the Gulf of Mexico if it is not diverted; and the Canadians are now irrigating lands in Leftbridge, beside the St. Marys River, about 50 to 75 miles away. It goes into the Valley River, then into the South Fork of the Saskatchewan, and ultimately into Hudson Bay. The Canadians are now irrigating 35,000 acres of land up here in the vicinity of Leftbridge, along in this country [indicating]. They have several colonies in there, and are raising sugar beets there to-day in quantities and have a beet-sugar plant.

Mr. REEDER. Do they get the water from these lakes?

Mr. SAVAGE. The water comes without regulation. They divert it at a point here by Kimball, right there. There is their canal. They go down here, and not here. They also have a canal which starts right there and diverts over in here, ultimately getting into this lake, or it may go down here. They are building their works while we are negotiating, and our President has seen fit to tell us that we had better go up and build something ourselves, and then, if necessary, we will negotiate afterwards.

Mr. REEDER. That is a good suggestion.

Mr. SAVAGE. In that case the Departments that are interested in these Indians in the Blackfeet Reservation have rather insistently invited us to utilize Indian labor so far as practicable, as the water originates in the reservation, and the ditch is across the reservation, and they have irrigable lands within the reservation.

Mr. COOPER. Will these Indians labor?

Mr. SAVAGE. Oh, yes; they are good workers.

Mr. COOPER. I saw some last summer when we were out there that seemed to be doing a fair day's work.

Mr. SAVAGE. The Apaches are working, and these fellows have been working very well. We will, of course, undertake to reduce it to task work, piecework, or yardage, just as soon as practicable; but we expect to get full value received. We propose to send to advertisement at this time the first 15 miles of the work, and then undertake to work the Indians on a section of it, and just as far as practicable to utilize their labor. The day before I left Billings our engineers

were sent into the field to construct temporary buildings there. We are sending out a sawmill to put up in the reservation to saw our lumber for the camps and also for construction work throughout, including the contractors. We specify in the contract that lumber will be furnished by the United States at a certain fixed price at the mill, and we will carry on this combined advertised contract work and Indian-labor work in conjunction.

The next work that is just going into construction is the pumping projects in North Dakota. Three of them have been developed up to the stage of approval of specifications by the chief engineer and sending to advertisement. The fall of the Missouri River is only eight-tenths of a foot per mile—so slight that it is not practicable to take out any water by gravity. The immense deposits of lignite coal in that vicinity make it entirely practicable to lift the water by pumping, utilizing that lignite as fuel; and we have three little projects of 10,000 acres each, separated by 30 miles, that it is proposed to put under construction at a very early date.

Mr. KENNEDY. At what points?

Mr. SAVAGE. At Buford, which is close to the boundary line of North Dakota and Montana; at Williston, which is 30 miles down, and at Nesson, which is 30 miles farther down the river, all on the left or north side of the Missouri River.

The banks of the Missouri, as you all know, are very unstable and very uncertain in their location, etc., and it is so difficult to get a permanent location for a pumping plant there that we find on investigation that it is entirely practicable to mount these pumps on barges. The power will be generated at the mine where we mine the lignite and converted into electricity, and will be conducted down to this pumping station, either on barge or on shore; so we will simply put these pumps with the electric motors on the barges, connected up by a flexible pipe to a ditch on land that may be extended or curtailed as required.

Mr. COOPER. How much will be the lift there?

Mr. SAVAGE. The lift at the first pump will be a maximum of 28 feet. As the river rises it may be cut down to 15 feet. The barge will simply go up and down the stream, and then as soon as the irrigation season is over the barge will be run down the stream and put up out of the way until the next season.

Mr. COOPER. What will be the length of the irrigation season?

Mr. SAVAGE. The length of the irrigation season will be not over three months.

Mr. KENNEDY. You pump the water in each instance right out of the river?

Mr. SAVAGE. Right out of the river to these canals, and then inland to where this electric station will be—not on the barge. We will have another pump or two inland on that canal to lift to the lateral canals. Pumping in this northern country is, of course, rather novel, although there are some small pumps driven by gasoline at the present time that are reasonably successful. But that great quantity of fuel and the fact that the irrigation is not practicable in any other way seems to make that the desired method of conducting the work.

Mr. COOPER. What is the nature of the climate in that section? Is it not pretty cold there, and are not the seasons short?

Mr. SAVAGE. The seasons are not very long; but alfalfa does very well, indeed.

Mr. COOPER. How many crops will be cut?

Mr. SAVAGE. They will cut two.

Mr. KENNEDY. How about wheat?

Mr. SAVAGE. Wheat grows extremely well. Dakota's wheat crop, you know, is wonderful; and there are other possibilities. Then, vegetables do fairly well there.

Mr. COOPER. Beets?

Mr. SAVAGE. Yes; it is said to be exceptionally good sugar-beet land.

Mr. REEDER. How about potatoes? That ought to be a good potato country, is it not?

Mr. SAVAGE. It is a good potato country.

Mr. REEDER. I should think so.

Mr. COOPER. It would not be a good corn country, though, would it?

Mr. SAVAGE. I think the season is probably too short for the average western corn. The squaw corn, as they call it there, or this flint corn, would probably mature there in ninety days.

Mr. REEDER. Corn is hardly valuable enough, anyway.

Mr. KENNEDY. What is your estimate of the cost per acre under these pumping projects?

Mr. SAVAGE. The estimated cost per acre is between \$20 and \$25 for installing the machinery and constructing the canal system throughout. Then the cost of operating will be, of course, somewhat higher than that of gravity systems.

Mr. KENNEDY. Simply material?

Mr. SAVAGE. Simply material; with coal for the mining. We expect to locate one of these plants—the big generating plant—directly on the line where the fuel will come out of the mine by gravity and go down to the plant.

Mr. COOPER. There would be a heavy maintenance charge there, it seems to me, all the time.

Mr. KENNEDY. The cost of maintaining and operating the pumping plant would be greater in proportion than the cost of maintaining the other?

Mr. SAVAGE. Yes; but we have, to counterbalance that, of course, the great cost of running these enormously large canals long distances before they get to the irrigated country. The cost of any pumping plan is, of course, large, like the maintenance of any piece of machinery.

Mr. COOPER. I do not see how you can turn that kind of a plant over to the water-users' association in a given time in the same way that you could where you had storage reservoirs, because the whole operation depends upon running these pumps.

Mr. SAVAGE. As I understand, it is entirely within the province of the Secretary to determine as to the rules and regulations that these water-users' associations will put into effect. It must be subject to his acceptance.

Mr. KENNEDY. It would be so much to the interest of the water users living subject to these projects to have the whole system maintained in its perfection that they would agree to almost anything that was reasonable or right.

Mr. COOPER. Are these lignite coals in private or Government ownership?

Mr. SAVAGE. They are in Government ownership. We have withdrawn them. Those lignite veins cover thousands of square miles of area in North Dakota. We have withdrawn a supply for each of the projects that is adequate for several hundred years of full operation. In the one case it is at the site of the generating power station. In another case it is $2\frac{1}{2}$ miles from the generating station and about 300 feet in altitude above it. In the third case it may be up at the Yellowstone River, mined and delivered by barge on the river to the pumping station located beside the river, or it may be inland by railroad. The fuel conditions seem to be quite ideal.

Mr. KENNEDY. Mr. Savage, in these mines do you get the coal by going down into the earth or by working in on the level?

Mr. SAVAGE. Simply by drifting in. These mines outcrop in veins; sometimes in veins varying. The veins that we expect to work here are 7 and 11 feet deep, respectively. Two of them are superimposed and only about 50 feet apart.

Mr. KENNEDY. Then you have no trouble whatever there with water getting in the mines?

Mr. SAVAGE. None whatever. This lignite coal, you know, is a very low grade of coal; but we have conducted this season a great many tests in Denver in commercial plants, and have gotten satisfactorily high duty. It requires a special form of what is known as a "Dutch oven boiler setting" that so consumes the fuel as to utilize the gases in place of letting them go off in the chimney; and we also have at Bismarck a plant that is working there commercially, and has been for years, and we have made tests of it, so that there seems to be no question about the feasibility of that fuel.

There have been a large number of investigations made up in my district this year, one of them in the case of the Sun River, where \$500,000 only has recently been set aside for the constructing of the first unit. We expect to get about 16,000 acres of land there, conditional on the opening of the Fort Shaw Reservation, which was to come up this morning, I believe.

Mr. COOPER. When do you expect to have any of these three small projects in North Dakota, of 10,000 acres each, under irrigation?

Mr. SAVAGE. It has been hoped that they could be put under irrigation some time in the year 1907. There has been great delay in getting those things in shape. The people have not had experience in irrigating, and they have been slow about signing up their contracts with the Secretary; but we hope it will be some time in 1907, but not earlier than that—possibly very late in the season of 1907.

Mr. COOPER. Is there a demand for all of these lands that you are going to irrigate here under these projects?

Mr. SAVAGE. The demand for those lands is so great that the lawyers over there have been attending to real estate rather than to the organization of water-users associations. They have been placing those lands very rapidly. There is a big demand for them.

Mr. COOPER. One general question: Under all these different projects that are under your supervision, Mr. Savage, how many acres of land will be brought under irrigation?

Mr. SAVAGE. I will give you the complete list:

The Shoshone project, first unit 28,000 acres; ultimate possible area 300,000 to 400,000 acres.

Huntley, total 30,000 acres.

Lower Yellowstone, first unit 28,000 acres; ultimate 67,000 acres.

Milk River, ultimate 150,000 acres.

Sun River, first unit 16,000 acres; ultimate 225,000 acres.

Buford-Trenton, first unit 10,000 acres; ultimate 25,000 acres.

Williston, first unit 12,000 acres; ultimate 40,000 acres.

Nesson, first unit 12,000 acres; ultimate 30,000 acres.

Mr. REEDER. Would it be the truth to say that in the case of all projects except the Milk River the waters now flow into the Missouri River? The Milk River does, too—no; the Milk River does not?

Mr. SAVAGE. The Milk River does. In all of the projects that have just been described the water flows into the Missouri, with the exception of the water of the St. Marys, which is being brought into the Missouri River. The influence, of course, is small in any individual place; but the Shoshone reservoir has a flood discharge of upward of 12,000 cubic feet per second. We propose to reduce that to an absolutely controlled discharge and string it over the season.

Mr. REEDER. You want to reduce it on the Platte River, too?

Mr. SAVAGE. We expect to.

Mr. COOPER. Is there any scarcity of water in any of these projects, or is it only a problem of getting the water on the land?

Mr. SAVAGE. There is no scarcity of water in either of these projects at this time.

Mr. KENNEDY. I understand Mr. Savage has covered in a general way all of this work except one project. Am I right?

Mr. SAVAGE. Yes; the Sun River project.

Mr. KENNEDY. We had better let him speak of that.

Mr. SAVAGE. The Sun River project has just been approved to the extent of \$500,000, and an effort is going to be made to get some land under irrigation with that amount. It is a large project and the supply of water is practically all appropriated at the present time. We get the required water supply by storage in that case, but there is a small reservoir that I think we can handle, and by dropping it down through the river and by a cheap diversion it seems at this time possible to get 16,000 acres under irrigation by the use of that limited fund, provided this Fort Shaw Reservation can be opened up for reclamation work. That is now being considered, and, I understand, is favorably looked upon.

I think that covers in a very brief way those affairs up north—the operations as a whole. The relations are particularly cordial between the reclamation service and all the larger interests, both the railroads and river transportation. We had last season very pleasant relations with the people who owned those steamers that have been running up the rivers, and they joined in a memorial to Congress asking it to authorize the construction of those dams. There is, of course, going to be some difficulty with the control of these works afterwards. Our United States attorneys are very cooperative, but they have not much time, and from time to time in these contract matters we have to call on them. The Attorney-General has authorized us to do so, and they do what they can; but they have not much time to do for us or with us. I suppose there may be rea-

sonable necessity for some legislation in time that will put that in shape. But physically, at the present time, except for these contract conditions, that we are all glad are so—it is pleasant to have things so good through the United States that contractors are not suffering for work—I think we are getting on very well.

The CHAIRMAN. I notice in your annual report that you make mention of quite a number of different projects in the State of Montana.

Mr. SAVAGE. Yes, sir.

The CHAIRMAN. Do you contemplate confining your efforts pretty largely to the works under construction this year?

Mr. SAVAGE. Entirely so. We have had requests so urgent that they could not consistently be refused to make certain investigations, and that was done, until a number of these projects were decided on; and it is the expectation that no reconnoissance work whatever of any magnitude will be taken up throughout that entire region.

The CHAIRMAN. I notice that you have in your estimates for the coming year estimates amounting to several thousand dollars?

Mr. SAVAGE. It must be in Madison River, Lake Basin, Clarks Fork, De Smet (De Smet, Wyo., of course), and Bismarck.

The CHAIRMAN. You have another place where you have set out, Mr. Newell, just your estimate of expenditures. For instance, I notice here that you estimate for the Sun River project in Montana, for the quarter ending June 30, 1906, \$15,000, as I see it here.

Mr. SAVAGE. The Sun River project has been approved by the Secretary, and \$500,000 has been set aside for its immediate construction.

The CHAIRMAN. Then, that is one of the projects you will construct?

Mr. SAVAGE. Permit me to explain that there are a good many of those things that are uncertain, and we had to anticipate and make provision so that we could legally do things if they should become necessary; and since that estimate was put in by me the Secretary has seen fit to approve that project, and we have that amount of money to do that.

The CHAIRMAN. Then, I notice that you propose some additional expenditures, about \$3,000, on the Crow Reservation project?

Mr. SAVAGE. Yes; we have three projects down through there. Stream-gauging work is being carried on. There are numerous expenses—administrative, executive, etc.

The CHAIRMAN. On the Madison River you also estimate about \$3,000?

Mr. SAVAGE. Yes; and the Madison River project will be completed. The final report is now on the rolls of the chief engineer of that entire project, which contemplates the irrigation of 165,000 acres of land with water from Madison River. The expense of it is so great as to be prohibitive at this time.

The CHAIRMAN. And the Lake Basin project?

Mr. SAVAGE. The Lake Basin project contemplates irrigating 320,000 acres of land north of Billings with water from the Yellowstone River, diverting at Livingston. That expense is too great for immediate construction. That investigation will be completed the 21st

of this month and a final report made, and those engineers on the Madison River have already been transferred. The engineers from Lake basin have been assigned and will be transferred to Nesson, N. Dak.

Mr. REEDER. To where?

Mr. SAVAGE. To the Nesson project, in North Dakota. That is one of the Wyoming projects.

The CHAIRMAN. You also contemplate some work on the Clarks Fork project?

Mr. SAVAGE. The Clarks Fork project estimates are complete, the final report is complete, and the engineers have been transferred to the Shoshone dam work. Desmet is in that same class; and we have an allowance in there, you will see, probably of about \$100,000.

The CHAIRMAN. Yes; I notice that.

Mr. SAVAGE. There is to be a final board investigation and report on Desmet, probably between the 25th of April and the 1st of May.

The CHAIRMAN. Now, Mr. Savage, we would like to hear from you further; but the House is in session and has been for an hour, and there are a number of important matters that I think members are anxious to go up and look after.

Mr. SAVAGE. Gentlemen, I want to thank you very much, and I want to invite you to come out and see us and help us do things in the field as well as in town.

The CHAIRMAN. We want to thank you very much for your statement before the committee, for enlightening the members of the committee on this important subject.

(The committee thereupon adjourned until Thursday, April 19, 1906, at 10.30 o'clock a. m.)

THE COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Thursday, April 19, 1906.

The committee met at 10.30 o'clock a. m., Hon. Frank W. Mondell (chairman) in the chair.

The CHAIRMAN. While we have not a quorum, I think we should begin, as several members of the committee are close by and will be in directly. I want to say that I suggested to Mr. Newell this morning that we begin by hearing from him on the subject of the plan of organization of the Reclamation Service and the condition of the reclamation fund.

STATEMENT OF MR. F. H. NEWELL, CHIEF ENGINEER RECLAMATION SERVICE, UNITED STATES GEOLOGICAL SURVEY.

Mr. NEWELL. Mr. Chairman and gentlemen, on the wall are charts showing diagrammatically the organization of the work and the condition of the fund.

FINANCIAL CONDITIONS.

This diagram shows the receipts from the whole of the public lands in the reclamation States since 1892, or ten years before the passage

of the act. In 1892 the receipts were a little over \$3,000,000. In 1892 they dropped to \$2,000,000, and then declined rapidly until in 1893 they were approximately \$1,000,000. After that they rose very rapidly and steadily, reaching a maximum in 1903 of over \$8,000,000. That is the highest amount received by the Public Land Office since it was instituted.

The abnormal increase dropped off quite rapidly, and in 1904 it was less than \$7,000,000, and in 1905 less than \$5,000,000, and it is estimated for 1906 by the General Land Office to be \$3,250,000, for 1907 \$3,000,000, and for 1908 \$2,750,000. The later estimates indicate that the figures for 1905 will be a little larger than at first assumed, but plans have been made on the basis of having the amounts for 1906, 1907, and 1908 as shown here, averaging \$3,000,000. That will make an aggregate from 1901, when the law went into effect, to 1908 of, in round numbers, \$37,000,000. Plans have been made for the expenditure of \$37,000,000 on about 20 projects which have been approved by the Secretary of the Interior. The second diagram [indicating second diagram] shows the amount of money received in 1901; the amount received at the end of 1902, including 1901; the amount received in 1903, including the preceding years, and so on, showing the gradually increasing total of the reclamation fund up to 1908 of about \$37,000,000.

The black line shows expenditures made at the ends of the same years. No expenditures were made, of course, in 1901 or 1902, but in 1903 a small amount was expended; in 1904 about a million total; in 1905 the total expenditure to that date was over \$6,000,000, and at the end of 1906, on June 30, it is probable that we shall have expended more than \$17,000,000, and on June 30, 1907, we shall have expended, under present plans, upward of \$30,000,000, while by June 30, 1908, we shall have expended practically all, assuming that the contracts that are now let will go on at the rate at which they have been taken.

Mr. MARSHALL. You do not mean that that has been expended, but it has been allotted and estimated to be expended?

Mr. REEDER. It will be expended?

Mr. NEWELL. It will be, if the work goes on at the rate at which we have estimated it might be done. As a matter of fact, most of the contractors are falling behind on their contracts, and a few are defaulting, and there is no probability, although there is a possibility, that all the money will be expended in 1908.

Mr. MARSHALL. What do you mean by "expended?" Do you count it expended when you let the contract, or when the payments are made on the contract?

Mr. NEWELL. When it is actually paid.

We put in as a liability the total amount of the contract, but these black lines represent the amounts actually paid out of the Treasury.

Mr. REEDER. Do those receipts indicate return money received?

Mr. NEWELL. Those indicate money received only from sale of public lands.

Mr. REEDER. That is what I wanted to know.

Mr. NEWELL. There are other sources of increase, but we have not anticipated any until after June 30, 1908. We have now some small receipts from the sale of property. There will be other receipts from the bill which recently passed, permitting the leasing

of water power. In other words, the plans for the expenditure of the reclamation funds have been brought to a point where we can see the gradual expenditure of all funds which will come in.

The Reclamation Service during the little more than three years of actual work has passed beyond the first stage, namely, of survey and examination. For the first year or two or three years most of the work was on general surveys and examinations and preparation of plans for construction. That work has practically ceased, and now we have laid out plans approved by the Secretary of the Interior which will not only exhaust all the money in sight, but which, by extension of the work, will exhaust all the money that may come in if it is deemed wise to do so.

An estimate has been prepared, using a number of assumptions, showing what will be the condition of the fund if work is continued.

Mr. MARSHALL. No money has been paid in yet actually in return from projects?

Mr. NEWELL. No, sir.

Mr. MARSHALL. How soon will it commence to come in?

Mr. NEWELL. I have here a statement, copies of which are in the hands of each member of the committee, from which you can see that.

The CHAIRMAN. Mr. Newell, is this statement in different form, and does it contain some information not contained in the general statement that you transmitted to the committee?

Mr. NEWELL. It is in a little different form.

The CHAIRMAN. Is it sufficiently different, so that it would be well to have it inserted at this point in your hearing?

Mr. NEWELL. I think so; yes, sir.

The statement referred to is here printed in the record, as follows:

Financial statement—Reclamation fund.

Receipts:

Actual receipts fiscal year—

1901	-----	\$3, 144, 821. 91
1902	-----	4, 585, 520. 53
1903	-----	8, 713, 996. 60
1904	-----	6, 826, 253. 59
1905	-----	4, 805, 515. 39

Estimated receipts fiscal year—

1906	-----	a 3, 250, 000. 00
1907	-----	a 3, 000, 000. 00
1908	-----	a 2, 750, 000. 00

37, 076, 108. 02

Expenditures:

Actual expenditures fiscal year—

1903	-----	286, 440. 21
1904	-----	1, 461, 305. 01
1905	-----	3, 714, 523. 64

Estimated expenditures fiscal year—

1906	-----	11, 467, 484. 29
1907	-----	13, 000, 000. 00
1908	-----	6, 489, 407. 85

Estimated balance unexpended June 30, 1908----- 656, 947. 02

37, 076, 108. 02

^a From estimates of the General Land Office.

PRESENT AND FUTURE DEMANDS UPON THE RECLAMATION FUND.

Most of the projects already authorized for construction under the reclamation act embrace two or more units. In many cases a single unit of these projects has been undertaken and an allotment made on the basis of that unit. In several cases this allotment has proven to be too small and in other instances the unit is only a fraction of the entire development contemplated.

In the accompanying table the figures are arranged as follows:

First. Name of project.

Second. Allotment now authorized by the Secretary of the Interior.

Third. Acreage that will be placed under irrigation by completion of the first unit.

Fourth. Additional funds required to complete projects mentioned in column 1.

Fifth. Total acreage of completed projects.

Sixth. Estimated cost per acre under each project when completed.

The additional funds required to complete the projects named in column 1 are estimated to be about \$60,000,000, which must be provided after July 1, 1908.

Table of approved projects with estimated costs.

Project.	Allotment first unit.	Acreage.	Additional funds required to complete.	Total acreage.	Cost per acre.
Salt River, Arizona.....	\$4,550,000	160,000	\$1,100,000	200,000	\$28
Yuma, California-Arizona.....	3,000,000	80,000	1,200,000	180,000	32
Uncompahgre, Colorado.....	2,500,000	60,000	2,000,000	150,000	33
Minidoka, Idaho.....	1,300,000	60,000	1,700,000	120,000	25
Payette-Boise, Idaho.....	1,300,000	60,000	7,300,000	320,000	27
Garden City, Kansas.....	280,000	8,000	.....	8,000	32
Huntley, Montana.....	900,000	30,000	.....	30,000	30
Sun River, Montana.....	500,000	15,000	4,500,000	200,000	23
North Platte, Wyoming.....	3,330,000	100,000	4,000,000	220,000	33
Milk River, Montana.....	1,000,000	.....	3,500,000	175,000	26
Truckee-Carson, Nevada.....	3,000,000	180,000	6,500,000	350,000	27
Hondo, New Mexico.....	240,000	9,000	50,000	11,000	25
Carlsbad, New Mexico.....	600,000	15,000	.....	15,000	40
Rio Grande, New Mexico.....	200,000	10,000	7,000,000	175,000	30
Lower Yellowstone, Wyoming.....	1,900,000	50,000	300,000	67,000	33
North Dakota pumping.....	1,000,000	33,000	1,200,000	80,000	27
Klamath, Oregon-California.....	2,000,000	67,000	2,400,000	220,000	20
Umatilla, Oregon.....	1,000,000	15,000	.....	15,000	56
Belle Fourche, S. Dakota.....	2,100,000	60,000	500,000	80,000	32
Strawberry, Utah.....	1,250,000	25,000	.....	25,000	50
Okanogan, Washington.....	1,500,000	8,000	.....	9,000	55
Yakima, Washington.....	1,750,000	40,000	9,500,000	300,000	27
Shoshone, Wyoming.....	2,250,000	90,000	7,000,000	310,000	30
Total.....	36,430,000	1,180,000	59,750,000	3,198,000	.....

Projects under consideration and waiting for funds to become available.

Project.	Acreage.	Probable cost.
Little Colorado, Arizona.....	80,000	\$3,000,000
Sacramento Valley, California.....	500,000	15,000,000
San Joaquin Valley, California.....	200,000	5,000,000
Colorado River, Colorado, Utah, California, Arizona.....	750,000	30,000,000
Dubois, Idaho.....	100,000	3,000,000
Lake Basin, Montana.....	300,000	10,000,000
Las Vegas and Urton Lake, New Mexico.....	70,000	3,000,000
Walker and Humboldt rivers, Nevada.....	500,000	15,000,000
Red River, Oklahoma.....	100,000	4,000,000
John Day River, Oregon.....	300,000	10,000,000
Weber, Utah.....	100,000	5,000,000
Priest Rapids, Washington.....	50,000	2,000,000
Goshen Hole, Wyoming.....	120,000	4,000,000
Total.....	3,070,000	109,000,000
Total cost of approved projects in excess of present allotments.....	.....	60,000,000
Total.....	.....	169,000,000

The CHAIRMAN. I want to ask, Mr. Newell, if you think you can furnish us with reduced copies of these charts which can go into the hearings?

Mr. NEWELL. Yes, sir; I can furnish reduced drawings.

The CHAIRMAN. If so, before the hearings are printed, we will have these inserted in connection with your statement of this morning.

SIZE OF TYPE OF REPORTS.

Mr. KENNEDY. Right at that point I would like to ask you if the reports of the Reclamation Service could not be printed in a little larger type than is now used?

Mr. NEWELL. We have been endeavoring to have our reports printed in the same type as in previous years, but in consequence of the ruling of the Department the Public Printer has reduced the type for all Geological Survey octavo publications. It is a matter which I think is exceedingly unfortunate. If a thing is worth printing, it is worth printing in the type ordinarily used in similar books and as a publisher would print it. I have personally felt very much disappointed to find now that all our reports are being printed in this smaller type.

Mr. KENNEDY. I wish to say this on behalf of myself, and I presume that it applies to the other members of the committee, that we have very little opportunity to read these reports except at night, and a good many of us use glasses, and I will say freely that the reports are of very little use to me as printed.

The CHAIRMAN. I think that this report in its present form of type has driven me to glasses. After having read it for three days I purchased the first pair of glasses that I have ever worn.

Mr. KENNEDY. If the engineer can intimate to us how we can get this report printed in type so that the report is really available to us, we would be very glad, I am sure, to take whatever action is necessary.

Mr. NEWELL. The Department committee on publications desired to have all octavo reports set in 10 point, solid. As the lesser evil, the Public Printer decided to set these reports in 8 point, leaded.

The CHAIRMAN. Who should be reached in this matter?

Mr. NEWELL. Legally the Public Printer determines the type to be used.

The CHAIRMAN. In your estimation, would the request of this committee have any weight with the Public Printer?

Mr. NEWELL. Yes; I think it would. But in this case the Public Printer has reduced the size of the type as a result of the rulings of the committee in the Department of the Interior.

The CHAIRMAN. They have done that generally through all the publications of the Department of the Interior?

Mr. NEWELL. I presume so; it has been done through all the publications of the Geological Survey.

Mr. MARSHALL. Is it to reduce the expense of printing?

Mr. NEWELL. The intent is to reduce the cost. If the cost must be reduced, I would a great deal rather leave out half of the report and print the rest of it in readable type. Personally I have not been

able to proof read this report myself. I can not afford to risk my sight.

Mr. KENNEDY. I will frankly say that I do not propose to sacrifice my own in reading the report unless it can be read.

The CHAIRMAN. I would suggest to the gentleman that if he will prepare a request to the Secretary of the Interior that future reports of this service be printed in larger type and that the Public Printer be requested to so print the reports, all the members of the committee would be very glad to join him, and I think that might have some weight.

Mr. REEDER. You had better name the style of type that you want.

The CHAIRMAN. What is the name of the type that you have been using?

Mr. NEWELL. The third annual report is printed in 10-point type, leaded.

Mr. REEDER. What do you call this type [indicating report]?

Mr. NEWELL. That is 8-point, leaded. The instructions given have been to the effect that all octavo publications must be printed in 8 point type, which makes the page so dense that most of us require glasses to read it.

The CHAIRMAN. As a matter of fact, did it not require the purchase of a lot of new type to set up that matter in that way?

Mr. NEWELL. No, sir; that is set on the linotype. If the Department would state the ultimate limit of cost of printing, we would cut the material down so as to have what we do print in good-sized type. The custom has been to send the manuscript forward after editing. The size of type is determined by others without reference to what the author desires.

Mr. KENNEDY. My own judgment is that the usefulness of the reports is reduced one-half at least by the smallness of the type used in setting them up, and I will say to the chairman of the committee that if I can aid in getting this report printed in larger type by making a request to the chairman of the committee, or of the Public Printer, through the chairman of the committee, I will be very glad to do it.

The CHAIRMAN. Inasmuch as this report is now set up and printed, I suppose it would not be possible to secure a change in the type of the present report, but I think we should take such action as will indicate to those who decide as to the size of the type what our views are.

Mr. KENNEDY. Mr. Chairman, I am very anxious to have this hearing printed in type of such size that we can read it. If it is printed in the same type as the fourth annual report of the reclamation service I will not read it.

The CHAIRMAN. It will not be so printed; and I want to say that when the time comes for printing the next report, if there is any question about the size of the type in which it is to be printed—any question as to whether it is going to be printed in larger type or not—this committee would like to be informed, because we would like to use our influence, if we have any, to have the report printed in readable type. I have had a great deal of trouble in reading the report, and I have always considered that I had remarkably good eyes, and I have been driven to glasses lately.

RETURNS TO FUND.

Mr. NEWELL. Returning to the financial statement, the table given on page —, under the heading "Projects under consideration and waiting for funds to become available," shows what are known as secondary projects, on which construction has not yet been begun but on which surveys have been conducted to the point where it will be practicable to conduct them if funds were available.

The table on page — is theoretical in character and gives the probable rate of return of the reclamation fund, assuming no delay in the completion of the first unit, arranged in the order of probable completion. This table is largely guesswork, and assumes, for example, that on the first project to be completed—the Truckee-Carson, in Nevada, at a cost of \$27 per acre—there will be returned \$2.70 per acre on 150,000 acres irrigated in 1907, which would bring \$405,000 in the next year—1908. Then, in 1908 on the Truckee-Carson project there would be 180,000 acres irrigated, which, at \$2.70 per acre irrigated in 1908, would bring in in 1909 \$486,000. So that under this assumption, looking at the bottom of the table, in 1907 there would be a half a million acres irrigated, returning \$1,489,000 in 1908. As a matter of fact, while it might be possible, it would be highly improbable that all of that land would furnish returns, but this answers the question that was asked as to the probable or possible return to the reclamation fund.

The CHAIRMAN. Your estimate in this table is that in 1910 the returns may be \$8,598,000.

Mr. MARSHALL. The total returns up to that time.

The CHAIRMAN. That in 1910 the returns for that year and up to that time will amount to \$8,598,000?

Mr. NEWELL. Yes, sir.

Mr. MARSHALL. Mr. Newell, I do not see these Williston projects mentioned here, either as contemplated or otherwise. What is the condition of those? I see here "North Dakota pumping." Is that it?

Mr. NEWELL. "North Dakota pumping" is the heading which includes the Williston and similar projects in North Dakota.

Mr. MARSHALL. There have been no contracts let on them?

Mr. NEWELL. Plans and specifications are being prepared for advertisement.

Mr. MARSHALL. They are going ahead all right?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. I think that gives us a very good general idea of the condition of the fund.

Mr. MARSHALL. These statements are very nice and concise.

ORGANIZATION OF RECLAMATION SERVICE.

The CHAIRMAN. Mr. Newell, if you will give us a general statement of your organization, then I think we can go into the details of the work. My idea is that it would be well to follow a general plan in the hearings, unless there is some member of the committee who wants further information with reference to the condition of the fund in addition to what Mr. Newell has already stated.

Mr. NEWELL. The organization that is shown in broad diagrammatic form in the drawing is stated in detail in this printed sheet, corrected up to April, 1906. That statement is kept set in type, and changes are made each month, so that the men who are interested can be kept informed. This list shows the principal offices and in each district the engineers in charge and the principal contractors on the work.

Referring to the chart of organization, this exhibits the source of all responsibility as being in the Secretary of the Interior, to whom the Director of the Geological Survey reports on the details which have been committed to him by the Secretary of the Interior. At the beginning of each quarter in advance of expenditure or of any action whatever there is submitted to the Secretary of the Interior what is known as the quarterly statement and estimates, a volume of from 80 to 100 pages. This recites briefly everything that has been accomplished in the past, everything that is in hand, and everything that is proposed to be done during the next quarter. It is accompanied by a financial statement as to what has been expended, what are the liabilities, and how much money it is proposed to expend. The Department has as full information as can be given in writing as to the entire status of the work. That statement is approved by the Secretary of the Interior and a copy is transmitted to the Auditor for the Interior Department and becomes the authority for all expenditures and all auditing of expenses.

The Director of the Geological Survey is in effect the director of the Reclamation Service, and performs the functions of director in his intercourse with the Secretary of the Interior and with public men. All correspondence with members of Congress and with the public in general goes out under the signature of the Director of the Geological Survey.

The Director has advices from three sources: First, the chief engineer or assistant chief engineer or acting chief engineer regarding the management of the Reclamation Service; second, he also has the advice of the consulting engineer appointed by the Secretary of the Interior, who reports directly to the Director of the Geological Survey, and, third, he also has the advice of experts and others employed in the Geological Survey or elsewhere whom he may desire to call in.

The CHAIRMAN. The consulting engineer is Mr. C. E. Grunsky?

Mr. NEWELL. Yes.

The CHAIRMAN. Who are the gentlemen who would be designated under the term "experts and staff?" Are they the regular employees of the Survey?

Mr. NEWELL. The experts and staff are the regular experts of the Geological Survey and others who may be called in at any time.

The CHAIRMAN. Under that head you do not include any gentlemen who are regularly employed, but those who may be consulted by the Director as a matter of expert testimony?

Mr. NEWELL. Yes; the chief engineer and assistant chief engineer are the executive officers, through whom practically pass all of the details of engineering, general administration, and every matter, large and small, which must be transacted by the Reclamation Service.

The CHAIRMAN. Your assistant chief engineer is Mr. Davis?

Mr. NEWELL. Arthur P. Davis; yes, sir. The division of responsibility, then, naturally falls into expert engineering on the one side and general administration on the other; and then the large division of actual work in the field which is allotted to supervising engineers, who are practically the representatives of the chief engineer for certain large areas of country. This organization differs from nearly all others, in that the work is very widely scattered.

For example, at Panama they have simply one ditch 40 miles long, which might be considered a very simple matter from an administrative standpoint, while in the Reclamation Service we have ditches scattered hundreds of miles apart, and large structures, so that there is not the possibility of immediate personal contact that there is in Panama or in the New York State barge canal. Therefore it is necessary to delegate to supervising engineers in the field large responsibilities in order that they may act immediately and authoritatively.

CONSULTING ENGINEERS.

Taking up the subject of expert engineering, the principal groups that of the consulting engineers, of whom the principal are George Y. Wisner, who is also a member of the International Deep Waterways Commission; W. H. Sanders, Andrew J. Wiley, O. H. Ensign, Charles S. Slichter, and E. G. Hopson, and occasionally W. H. Code, who is chief engineer of the Indian irrigation. Those consulting engineers meet from time to time and consider all details of expert engineering, of plans and specifications. They are convened to open bids and to recommend the action to be taken on the bids, whether of acceptance or of rejection.

The CHAIRMAN. Are the bids always opened by the consulting engineers, or some of them—that is, in their presence?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. They pass upon the bids?

Mr. NEWELL. They pass upon the bids originally.

Mr. MARSHALL. Is that done here?

Mr. NEWELL. We open no bids in Washington.

Mr. MARSHALL. It is done on the ground?

Mr. NEWELL. The bids are opened on the ground and in the presence of the bidders. As a rule all the principal contractors go on the ground to see the work, and stay until the bids are opened, so that they may obtain at first hand the figures that are submitted by their competitors.

The CHAIRMAN. Ordinarily the bids are opened at the office of the supervising engineers?

Mr. NEWELL. Yes. Or at the most convenient spot for all concerned. We have found it very important to have the bids even on relatively simple matters opened by men not only of large experience, but who can not in any way be accused of having any personal interest in the awarding of the work. A great many complaints have been made of partiality. It is very easy to answer such complaints, because the men who have opened the bids and who recommend primarily the action on the bids can not be questioned as to their absolute fairness.

Mr. KENNEDY. They are men of large reputation?

Mr. NEWELL. Yes.

Mr. MARSHALL. So that the men who have really had charge of these projects and brought them up to the point of letting the contracts have nothing to say about the contracts?

Mr. NEWELL. They usually form one of the board and have a voice in it.

Mr. MARSHALL. It would not be very extraordinary that they should be prejudiced in one way or another, if it was left to them entirely?

Mr. NEWELL. Yes. We try to eliminate all local prejudice or personality.

DIAMOND DRILLING.

Another detail of expert engineering is the diamond drilling, which is relatively a small matter, but is carried on by experts in that line.

The CHAIRMAN. Your diamond drilling force, for instance, you send from one project to another as they are needed?

Mr. NEWELL. Yes.

The CHAIRMAN. As they are required?

Mr. NEWELL. Yes. The same foreman is moved around. We have a number of machines, and the diamonds are kept in the custody of careful men.

The CHAIRMAN. Do you have one man who is in charge of that class of machinery, or do you depend upon the supervising engineers and the engineer in the field on the project where they are employed at a given time?

Mr. NEWELL. One man has exclusive charge of all that machinery—George A. Hammond—and he, on the request of the supervising engineers, sends the men there and himself sees that the work is well done.

Mr. KENNEDY. As the diamond drilling force passes from one project to another do they thereby become subject to the direction of the engineer having charge of that project?

Mr. NEWELL. Only in a general way, on the location of the work. The way in which it should be done is under the direct charge of Mr. Hammond.

Mr. KENNEDY. He is the chief of the diamond drilling force?

Mr. NEWELL. Yes.

The CHAIRMAN. In other words, the man in the field would say that he wanted a diamond drill hole at a certain place?

Mr. NEWELL. Yes.

The CHAIRMAN. And Mr. Hammond would come and put it down?

Mr. NEWELL. Yes; and the style of machine to be used is determined by Mr. Hammond, and he is also responsible for the diamonds, and the wear on them, and he computes very carefully from time to time the wear and tear on the diamonds, the labor of the men, and all other items of cost.

Mr. KENNEDY. What is the estimate of the cost of the diamonds used in the work throughout the entire service?

Mr. NEWELL. The cost of the diamonds was \$15,156.18. The wear on them is very small. We occasionally get a defective one. The cost of the drilling has averaged \$2.85 per foot.

TESTING MATERIALS.

The testing of materials is a very important function, which is being performed at the Geological Survey testing laboratory at St. Louis, largely. Other places for testing are at the various manufacturing works where we are buying cement, and where we have suitable machinery—as at Roosevelt, Ariz.

The CHAIRMAN. Your material-testing men are generally men connected with the various projects?

Mr. NEWELL. They are in part——

The CHAIRMAN. You have no distinct corps?

Mr. NEWELL. In part; yes, sir. Under the head of cement tests, Richard L. Humphrey has charge of all the cement tests at St. Louis, and does nothing else. He has a chemist, C. H. Stone, who analyzes the cements there. Edward Duryee at Roosevelt, Ariz., has charge of the mill there, and also makes some tests. J. Y. Jewett travels most of the time and has small laboratories at the different cement works where he goes to make tests.

The CHAIRMAN. He, then, is your material-testing man in the field?

Mr. NEWELL. Yes.

The CHAIRMAN. Mr. Humphrey and his assistant have charge of your larger laboratory?

Mr. NEWELL. Yes. It is not our laboratory, but we get the use of the Survey laboratory and pay as we would an outside firm for the use of the material. All material is bought on test, steel or cement, and is put through the usual commercial tests for its fulfilling the requirements.

The section of technical review is located here in the city of Washington, and consists of a number of engineers who take the plans, specifications, and all details which must go to the chief engineer. They study these from the strictly technical side as to the accuracy of the statements, as to the amount of stress or strain that should be required on certain structures—whether a gate is heavy enough, whether under the vibration and load the thickness of web is sufficiently great, and so on. These important assumptions are verified here by computations separate from those of the original designers. The facts as to the thickness and strength of any structure, gate, or headworks or dam are considered and checked against the figures of the men in the field to see if there has been any large blunder made.

SOIL CLASSIFICATION.

The soil classification is a study of the soils and their particular value on each of the 40-acre tracts which are to be reclaimed. That is being done by Thomas H. Means, probably one of the best soil men in the country, who was educated in the Department of Agriculture in the Soil Bureau, went to Egypt and studied alkaline conditions there and in the Mediterranean countries. He is thoroughly equipped for that work. He, with his assistants, prepares the maps of farm units—that is, they decide how much land and the character of land which should be allotted to an individual farm.

Mr. KENNEDY. Before you leave that, what you have been discussing there with reference to soil classification has to do particularly with the capacity of the soil for crop production?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. Now, do you take into account in addition to that the quality of the soil with reference to the water-carrying qualities, and getting the water to the point of distribution?

Mr. NEWELL. Yes, sir; it is very important that we consider not merely the soil itself, but all the surrounding conditions, not merely getting water to and from it, but methods of transportation, and the probable development of manufacturing industries. The soil classification grows out of the requirement of the reclamation act that a sufficient area should be allotted for the support of a family. To determine that amount we must know a great many of the other conditions besides soil conditions.

Mr. KENNEDY. Do you also consider the nature of the soil with reference to the loss by seepage?

Mr. NEWELL. Yes. That is studied very carefully in planning the canals.

The CHAIRMAN. That is a branch of your hydro-economics?

Mr. NEWELL. Yes.

The CHAIRMAN. Rather than of the soil classification, as I understand it?

Mr. NEWELL. Yes. The other branches are hydro-economics and hydrology, which are more or less technical studies. The hydro-economic investigations deal with the character of the water itself; its value not so much from its quantity, but from its quality—whether it is too hard or alkaline.

Mr. MARSHALL. With reference to its effect on the plants?

Mr. NEWELL. Yes. Taking the other side, the administrative side, the subdivision naturally falls into correspondence and records. I may say that our correspondence is very large. We have several hundred letters a day on all possible phases of the question, not only of reclamation, but on almost every other question that the human mind can conceive of.

The CHAIRMAN. You have a very great deal of inquiry relative to your projects and to the character of the lands and the methods of securing them, and so forth?

Mr. NEWELL. Yes.

Mr. KENNEDY. Where do most of the inquiries come from?

Mr. NEWELL. From all over the world. We have a great many letters from people in the East who are seeking new homes, and thousands of inquiries as to where they can go to improve their conditions. We have many inquiries from farmers in Ohio and Indiana, wanting to know how to take up the land. We have a large correspondence from abroad, from people who would like to come over there, and who have heard of the free homes. There is probably no section of the earth from which we have not some general inquiries as to the work and how far it has progressed.

Mr. KENNEDY. You consider, do you not, that that is a legitimate part of the work of the Reclamation Service, to convey to people who inquire the information within your possession?

Mr. NEWELL. We must do it. We could not do otherwise. For instance, a member of Congress very properly insists that his constituents shall have replies. I had a check made one week on the amount of time taken up in that manner alone. From one-half to

two-thirds of the correspondence originated from Congress. Very properly we must answer those, and give them the best information that we have.

Mr. MARSHALL. Can not you answer those largely by printed letters?

Mr. NEWELL. We do, as far as possible. In that connection I would like to show a few printed statements illustrating those which are sent out.

The statements referred to are here printed in the record, as follows:

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
RECLAMATION SERVICE.

Irrigation projects.

The following brief statement regarding irrigation projects under consideration and construction by the United States Reclamation Service and concerning irrigable lands in public and private ownership which will eventually be reclaimed by means of proposed systems, is published in circular form for convenience in answering inquiries and for the information of the public generally.

ARIZONA: SALT RIVER PROJECT.

This project contemplates the construction of a large storage dam at Roosevelt, Ariz., 270 feet in height, which will regulate the supply of water from gravity systems for about 160,000 acres of land in the vicinity of Phoenix. When the dam is constructed there will be developed a large amount of power which will be utilized to increase the water supply in the Salt River Valley by means of pumping from underground sources.

Early in 1904 contracts were awarded for construction of considerable auxiliary work, power canals, sluicing tunnels, etc. A cement mill was erected by the Government and is now in operation, furnishing a first-class quality of cement to be used in the works. The construction of the dam will require 220,000 barrels of cement. The excavation work for the power canals is completed, the lining of canals is nearly completed, and the work on the sluicing tunnel was finished on October 3, 1905. The contract for the construction of the large dam was awarded to J. M. O'Rourke & Co., of Galveston, Tex. It is understood that there are no public lands available under this project for homestead entry, the entire area having been filed upon by settlers, many of whom have gained title to the land. For information as to the possibility of acquiring lands by purchase from present owners, and other data of a local character concerning the soil and climate of the valley, apply to Mr. B. A. Fowler, president of the Salt River Valley Water Users' Association, Phoenix, Ariz. The irrigable lands under this project are tributary to branch lines of the Southern Pacific and Santa Fe Railroad systems.

CALIFORNIA: YUMA PROJECT.

This project contemplates diversion of the waters of Colorado River, by means of proposed Laguna dam and sluiceways, about 10 miles northeast of Yuma, Ariz., into two canals, one on each side of the river. In Arizona, these canals will irrigate all the bottom lands of Colorado and Gila rivers, between the Laguna dam and the Mexican boundary (an area of 84,000 acres, in round numbers), and in California, the bottom lands in the Yuma Indian Reservation (an area of 17,000 acres), all tributary to the Southern Pacific Railroad. Plans also contemplate the construction of a complete system of levees to protect the bottom lands from overflow, and a pumping system to remove the surplus water from the low-lying areas.

Lands under this project have been withdrawn, under the provisions of the reclamation act of June 17, 1902, from all forms of entry except by homestead.

The mesa lands have been withdrawn from all forms of entry. Under the provisions of this act an individual holding may not exceed 160 acres. Definite decision has not been reached as to the farm-unit area, but it will probably not exceed 40 acres to each entryman.

The method by which the lands of the Uma Reservation will be disposed of to settlers has not yet been announced. It is probable, however, that the reservation will be thrown open upon the completion of the irrigation works.

The cost of the works will be assessed proportionately upon each acre of land reclaimed, to be paid by settlers in 10 annual installments, without interest. The only additional charge will be for maintenance. The distribution of water, collection of payments, maintenance charges, etc., will be looked after by the Yuma County Water Users' Association, M. Winsor, president, at Yuma, Ariz. The members of this association are the landowners of the district to be affected. Printed matter and information of a local character regarding the section may be had upon application to the association headquarters, at Yuma, Ariz.

On July 6, 1905, a contract was awarded to J. G. White & Co., New York, for the construction of the Laguna dam and sluiceways. Excavation is being carried on, and other preliminary plans are under way with a view to the construction of the dam. On September 13, 1905, a contract was awarded for the construction of Yuma dikes, on which actual work is now under way.

COLORADO: UNCOMPAGRE VALLEY PROJECT.

This project contemplates the diversion of waters of the Gunnison River by means of a tunnel of 30,000 feet in length, cross section 10½ by 11½ feet, cement lined, capacity 1,300 second-feet. The tunnel passes under a high divide and carries the water to the Uncompagre Valley, where it will be utilized for the reclamation of 120,000 acres of land in Montrose and Delta counties. Construction of tunnel was begun in November, 1904, and work thereon has since been progressing rapidly. More than a mile of the tunnel is completed.

About 80 per cent of the irrigable lands under this project are in private ownership. The remaining 20 per cent are subject to homestead entry by bona fide settlers, in accordance with the rules and regulations governing that class of entry. The farm unit for first-class land will probably be 40 acres, while on other lands suitable for growing grain, sugar beets, and alfalfa, 80-acre tracts may be filed upon. At the proper time filings upon these lands should be made through the local land office at Montrose, Colo. No water can be delivered for irrigation prior to the crop season of 1909. All inquiries for information of a local nature concerning the character of the soil, crops, and climate of the section, etc., should be addressed to the president of the Uncompagre Valley Water Users' Association, Montrose, Colo. The lands are tributary to the Denver and Rio Grande Railway.

IDAHO: MINIDOKA PROJECT.

This project provides for the reclamation of about 130,000 acres of land lying on both sides of Snake River in southern Idaho. The area to be benefited is all Government land which has been withdrawn from general entry under the provisions of the act of June 17, 1902, but remains subject to entry under the provisions of the homestead law. Homestead entries within a radius of 1½ miles from the center of each town site established are to be limited to 40-acre tracts, and those on all other lands under this project to 80 acres. The soil is excellent, being a deep sandy loam free from alkali, now producing a thrifty growth of sagebrush. The cost of water right under this project will be \$26 an acre. Settlers are permitted to pay their water-right assessment in ten annual installments without interest. It is believed that all of the land is now filed upon by bona fide settlers. Contracts have been awarded as follows: In September, 1904, Bates & Rogers Construction Company, for construction of large dam, which is about one-half completed; in July, 1905, for construction of telephone system; during June and July, 1905, for construction of distribution system, this work being subdivided and contract awarded in sections to several contractors. Fair progress has been made in work on the distribution system, and strenuous effort is being made to complete the construction within the time specified by the contract. Present conditions indicate that water will probably be turned on the lands under the gravity canals late in the irrigating season of 1906. The lands to be included under this proposed system are tributary to the Oregon Short Line Railway, which has recently extended a branch

line through the Minidoka tract, upon which are located three town sites. Early in 1906 the Government will sell at public auction a restricted number of lots in each town site.

IDAHO: PAYETTE-BOISE PROJECT.

The Payette-Boise project ultimately will reclaim about 350,000 acres of land in the valleys of the Payette, Boise, and Snake rivers in southwestern Idaho. Of this area about five-sixths is without present facilities for irrigation. The valleys are tributary to the Oregon Short Line, the Boise, Nampa, and Owyhee, and the Idaho Northern railroads.

The complete plans propose the utilization of both the Payette and Boise rivers and include the construction of extensive storage works at the headwaters of each stream. The lands are in Ada, Canyon, and Owyhee counties and are smooth with gentle slope to drainage. The work of construction will be taken up by units and several years will elapse before the whole project is completed.

Information concerning lands, climate, etc., can be obtained by addressing J. H. Lowell, president of the Water Users' Association, Caldwell, Idaho.

KANSAS: GARDEN CITY PROJECT.

This project, by means of an extensive pumping system, will provide a supply of water to irrigate about 8,600 acres situated just east of Deerfield, in southwestern Kansas. The land in question is all in private ownership, and is under an existing irrigation system owned by the Finney County Farmers' Irrigation Association. The attempt to furnish water for the irrigation of these lands by a gravity system supplied by diversion from the river has not met with success, owing to the rapid loss of water from the river to the gravels and the uncertain volume of flow in this stream.

The proposed pumping plant is designed for the recovery of underground waters, and involves the construction of 23 separate pumping stations, each driven electrically from a central power station located on the main line of the Atchison, Topeka and Santa Fe Railroad.

The irrigation association now in existence proposes to transfer its system to the Finney County Water Users' Association, of Garden City, Kans., recently formed. Pledges of subscription to the stock of the Water Users' Association have been given for practically the entire 8,600 acres entitled to water from the system. The preparation of plans and specifications is well under way, and construction will be begun at an early date.

MONTANA: HUNTLEY PROJECT.

This project contemplates the reclamation of about 30,000 acres of land, located along Yellowstone River, in southeastern Montana, within the ceded portion of the Crow Indian Reservation, between Huntley and Bull Mountain station. The lands to be reclaimed are along the Northern Pacific and Chicago, Burlington and Quincy railroads.

They form a portion of the area which the Crow Indians, by treaty ratified by act of Congress approved April 27, 1904, ceded to the United States. One of the conditions named was the allotment to the Indians of homestead entries upon the reclaimed land. Upon the completion of said allotments the area remaining is to be subject to disposition in accordance with the provisions of the homestead laws and the rules and regulations governing the disposal of public land. The President of the United States is authorized to issue a proclamation giving notice to the public that the lands will be thrown open to general entry, and such notice will be issued at the proper time. During 1904 surveys were made to outline a comprehensive system of irrigation for a portion of these lands. This will necessitate the construction of a main canal 40 miles in length.

Contracts have been awarded for the construction of divisions 1, 2, and 3 of main canal, and it is expected that work will be started shortly. Contract for structures was awarded on July 24, 1905. Bids for constructing a distributing system and telephone system were opened on December 15.

In addition to the cost of reclamation, the price of these lands is to be \$4 an acre when entered under the homestead laws. Further information will be given to the public as the work progresses.

NEBRASKA-WYOMING: NORTH PLATTE PROJECT.

This project has for its object the storage of the flood and surplus waters of North Platte River in an immense reservoir in Wyoming, which will be made by constructing a dam 210 feet high in a narrow canyon of the stream, just below the mouth of Sweetwater River. During the irrigating season the water will be permitted to flow down the channel of the river a number of miles, where a low diversion dam will turn it into canals, which will distribute it over the lands to be irrigated. The land to be reclaimed is tributary to the Chicago and Northwestern, Burlington and Missouri River, and Union Pacific railroads. It is fertile and adapted to the successful growth of a wide variety of products. It is expected that water can be delivered for purposes of irrigation for the crop season of 1906. Several contracts for construction of auxiliary portions of the system have been awarded, as follows: On January 5, 1905, to Kilpatrick Brothers & Collins Company for the construction of the Pathfinder tunnel, in Wyoming—this work was completed on August 15, 1905; on August 1, 1905, to Geddes & Seerie Stone Company, for the construction of the Pathfinder dam, in Wyoming—actual work under this contract commenced September 25, when excavation was begun at the westerly approach to the tunnel. In addition, contracts for excavation for about 95 miles of the Interstate Canal and for reinforced concrete structures on the first 45 miles have been awarded. Work on the different schedules is progressing steadily.

When construction work has been advanced sufficiently to render such action advisable, homestead entries may be filed upon the irrigable area that is in public ownership. The size of the farm unit will probably be 80 acres. Applications will be received at Cheyenne, Wyo., the local land office for lands in that State, and at Sidney and Alliance, Nebr., the local land offices for lands in Nebraska.

Landowners in the districts to be affected have organized the North Platte Valley Water Users' Association. Persons interested in the section may obtain information of a local character by addressing Mr. Andrew Crawford, secretary of the association, at Scotts Bluff, Nebr.

NEVADA: TRUCKEE-CARSON PROJECT.

When completed it is believed that this system will provide an ample supply of water to irrigate about 350,000 acres of arid land in western Nevada. The first work of actual construction was begun in September, 1903, on a canal 31 miles in length, to divert water from Truckee River and convey it to the channel of Carson River, where a storage reservoir eventually will be built. This canal, together with about 270 miles of lateral ditches, is completed, and on June 17, 1905, the third anniversary of the reclamation act, occurred the formal opening of this project, the first to be constructed under authority of the law of June 17, 1902.

Water is now ready for delivery to about 50,000 acres, 30,000 of which are public lands, which have been thrown open to homestead entry and may be filed upon by bona fide settlers, in accordance with the rules and regulations of the homestead laws and reclamation act. The lands are tributary to the Southern Pacific and the Nevada and California railroads. An assessment of \$26 per acre will be charged against the land for its water right, payable in ten annual installments without interest. Maps showing the location of available entries may be inspected at the Carson City, Nev., land office, where application should be filed.

The construction of outlet and regulation works at the outlet of Lake Tahoe and the extension of the system to include additional areas will be undertaken at an early date.

NEW MEXICO: HONDO PROJECT.

This project contemplates the diversion of Hondo River, a tributary of the Pecos, and will make possible the reclamation of about 10,000 acres of land in the vicinity of Roswell. Contracts for the construction of the dam and canals were awarded on December 5, 1904, and judging from the progress which has been made upon this work, it is believed that the system will be completed during 1906. On November 2 a contract was awarded to Wood, Bancroft & Doty, of Omaha, Nebr., for the construction of the earth embankment in connection with the project, and the contractors have begun the work. The Pecos and

Northeastern Railroad has a line into Roswell. It may be possible to purchase homesteads from the present owners. Information on this subject and on the character of the soil and climate of the section may be had from Mr. J. W. Poe, president of the Rio Hondo Water Users' Association, Roswell, N. Mex.

NEW MEXICOS CARLSBAD PROJECT.

The principal works under the Carlsbad project include storage reservoirs on the Pecos River in Chaves County, and the extension of canals which have been constructed by private enterprise to irrigate about 15,000 acres of land. The development of Pecos Valley has been brought about by individuals, who installed an extensive system of irrigation works, representing the outlay of more than a million dollars. On October 4, 1904, a flood in the Pecos River destroyed a large portion of Avalon dam, upon which the canal system depended for its supply. The owners of the canal system were unable to repair the damages, and as property valued at not less than \$2,000,000 was threatened with destruction unless the water supply was provided, an appeal was made to the Government to take the works and to initiate construction in order to prevent the destruction of homes and property. It is expected that the construction of storage works will be begun at an early date. All of the land under this project is in private ownership, and is tributary to the Santa Fe Railroad. Inquiries concerning lands, crops, climate, etc., should be addressed to the Water Users' Association, Carlsbad, N. Mex.

NEW MEXICO—TEXAS: RIO GRANDE PROJECT.

The Rio Grande project involves the construction of a storage dam opposite Engle, N. Mex., across the Rio Grande, which will form a reservoir 175 feet deep at its lower end, 40 miles long, with a storage capacity of 2,000,000 acre-feet, for the irrigation of 180,000 acres of land in New Mexico, Texas, and Mexico.

The Leasburg diversion, which is a part of the Rio Grande project, calls for the construction of a 500-foot concrete dam, with pier, embankment and sluice gates, head weir, and head gates. In connection with the diversion dam it will be necessary to construct 2 miles of full-size canal to connect with the old Las Cruces Canal. Construction will be begun as soon as the landowners have given the Government security that this amount will be returned to the reclamation fund within a period of two years.

NORTH DAKOTA—MONTANA: LOWER YELLOWSTONE PROJECT.

This project contemplates the diversion of the waters of Yellowstone River at a point 17 miles northeast of Glendive, Mont., for the irrigation of 66,000 acres of land lying in northeastern Montana and northwestern North Dakota. The land is classed as follows: Montana, private lands, 14,618; public lands, 13,522; railroad lands, 16,742 acres; North Dakota, private lands, 12,786; public lands, 8,332 acres. The public lands under the project number 21,854 acres; railroad lands, 16,742 acres, and private lands, 27,404 acres, a total of 66,000 acres.

The public lands available for homestead entry should at the proper time be filed upon through the land office situated at Miles City, Mont. The lands to be affected by this system are tributary to the Northern Pacific Railway line, which passes through Glendive, 19 miles from the head gates, and the Great Northern Railroad, which has a station at Buford, 2 miles from the lower end of the project. They have been classified in detail. The most probable size for farms on this project will be 80-acre tracts.

Contract for the construction of the main canal was awarded in several sections on July 11, 1905. On division 1, schedule A, fair progress has been made. On division 4, schedule B, of this work, excavation for structures is under way. Work on divisions 1, 2, and 3, schedule B, of the main canal is progressing satisfactorily. Bids were opened on November 15 for the construction of the main canal and lateral system and for the construction of the Lower Yellowstone dam on December 5. The landowners under the system have organized an association, known as the Lower Yellowstone Water Users' Association, Mr. B. S. Adams, president, Ridgelaun, Mont. Persons interested in the section can obtain information of local interest by applying to said association.

OREGON: UMATILLA PROJECT.

The Umatilla project embraces 20,000 acres immediately south of Columbia River and east of Umatilla River. The engineer work in connection with this project consists of a feed canal from Umatilla River to the Cold Springs reservoir and a distribution system. The works are of simple character and capable of being constructed in a short time. The irrigable area under this project lies below 500 feet in altitude, is rolling in character, and the lands are of high fertility. The climate is warm and the soil adapted to orchards, small fruit, and vegetables. Transportation facilities are excellent, the lands being within 200 miles of Portland, Oreg., or Spokane, Wash., on the main lines of the Oregon Railroad and Navigation Company.

OREGON-CALIFORNIA: KLAMATH PROJECT.

The Secretary of the Interior on May 15, 1905, approved the proposed Klamath project. The total irrigable area under this project embraces 236,402 acres, of which 45 per cent, or 106,829 acres, is public land, and 55 per cent, or 129,573, is private lands, 90,000 acres being in California and the remainder in Oregon. The lands are of excellent quality, and alfalfa, wheat, oats, barley, rye, vegetables, and the deciduous fruits are grown successfully. Experiments of the culture of sugar beets show that this crop may become a profitable industry. The project is naturally divided into two distinct parts, the so-called "Upper Project," providing for the irrigation of lands in Langells, Yonna, Poe, and Upper Klamath valleys, and the Lower Project, which includes the irrigation of lands in Klamath and lower Poe valleys and the reclamation of Lower Klamath and Tule lakes by drainage. The principal town in the valley is Klamath Falls, Oreg., where headquarters are established for the engineer in charge of the project.

The greater part of the land in private ownership is held in large tracts, and under the provisions of the reclamation act, must be sold in small lots, as one person can not purchase water for more than 160 acres. The Klamath Water Users' Association, a corporation of landowners, has been organized to cooperate with and assist the Reclamation Service. The office of this association is located at Klamath Falls, Oreg., where persons interested should apply for pamphlets and descriptive matter. At the proper time settlers may file applications for homestead entries upon available public lands, those located in California being under the jurisdiction of the local land office at Susanville, Cal., while for Oregon land applications should be filed at the Lakeview, Oreg., office.

Specifications and proposals have been prepared for the construction of the main canal and the auxiliary works, and bids for this work were opened on December 29 at San Francisco, Cal. Actual construction of the system will be taken up as early as possible.

SOUTH DAKOTA: BELLE FOURCHE PROJECT.

When completed, this project will reclaim about 60,000 acres lying northeast of the Black Hills in Butte and Meade counties, S. Dak., tributary to the Chicago and Northwestern and Burlington and Missouri River railroads. Of the total irrigable area it appears that about 50,000 acres is public or Government land.

The classification of this land has been completed and farm-unit maps are in course of preparation. The size of farm unit has not been determined, but will probably be 80 acres of irrigable land, except in the vicinity of the new town site, where the unit may be 40 acres.

Present information is that the major portion of these lands has been filed upon in 160-acre tracts. This being the case, a reduction of each of such entries to one-half their present area will be ordered, an action which will make available for future settlement an additional number of entries equal to those already taken up.

Contracts for the construction of schedules 1 and 2 of main supply canal were awarded in April, 1905, and work on them is progressing steadily. On October 26 bids were opened at Belle Fourche, S. Dak., for the construction of the dam and distributing canals of the system. On November 2 the Secretary of the Interior awarded a contract for the work to Orman & Crook, of Pueblo, Colo.

It is expected that the south-side canal, which will furnish water to irrigate about 20,000 acres of land, can be constructed in time to deliver some water to this area in 1906. Application should be filed with the local land office at Rapid City, S. Dak., where maps showing the location of the entries will be available for inspection. General information regarding the lands and crops can be had from the president of the Belle Fourche Water Users' Association, Belle Fourche, S. Dak.

UTAH: STRAWBERRY VALLEY PROJECT.

This project provides for the irrigation of about 50,000 acres of land in central Utah, situated from 5 to 15 miles south of Provo and on the eastern shore of Utah Lake. The water supply will be received from a storage reservoir to be built on Strawberry River, about 30 miles to the east of the irrigable area. By means of a tunnel 4 miles long the stored waters will be carried under the divide and emptied into Spanish Fork, from which a canal from 18 to 20 miles long will convey it to the irrigable area. The irrigable lands have a mean elevation of 4,500 feet. Detailed information regarding the lands to be benefited and other facts of interest bearing upon local conditions in the Strawberry Valley may be had upon application to the president of the Strawberry Valley Water Users' Association, Spanish Fork, Utah.

WASHINGTON: OKANOGAN PROJECT.

This project is designed to supply water to 8,650 acres of land in Okanogan Valley, in northern Washington. The water supply is estimated to be sufficient for the proper irrigation of 10,000 acres, 1,350 of which are now supplied. The farm unit has not been definitely decided, but a soil survey is being made, and it is believed that on account of the possibilities for high development in this section the area allowed each settler will be restricted to 40 acres. Lumber for building purposes and fuel supplies is practically unlimited. The lands are tributary to the Great Northern Railroad.

WASHINGTON: YAKIMA VALLEY.

The Yakima Valley contains an irrigable area of approximately 500,000 acres; with storage it is estimated the water supply is sufficient for 340,000 acres. In addition to this acreage there are 100,000 acres in the Yakima Indian Reservation which can be brought under canals at a moderate cost, but for which there is no late summer flow in the river. The development of a comprehensive system of irrigation in Yakima Valley can be accomplished by the successive construction of several units of a general project, the work being gradually extended to embrace the entire irrigable area.

The Tieton division, which is an integer of the great work projected in the Yakima Valley embraces an area of about 24,000 acres west of and near the city of North Yakima. The water supply will be from Tieton River, supplemented by waters stored in Bumping Lake.

The Sunnyside division of the Yakima project contemplates the purchase, enlargement, and extension of the Sunnyside canal system now in operation, and in connection therewith the construction of suitable storage works at the upper Yakima Lakes. The Government holds an option on the property of the Washington Irrigation Company. The canal and lateral system contemplated as the first section of the work will irrigate about 40,000 acres of land. Before construction is begun there must be an adjustment of conflicting claims of those who are appropriating water from Yakima River and its tributaries, also a settlement of the suits now pending between the appropriators and the Government in behalf of the Indian reservation, and the satisfactory determination of questions presented by the proposed contract to purchase the Sunnyside canal. Sufficient acreage must be pledged to secure the return to the reclamation fund of the cost of construction. All of the lands in these projects are tributary to the Northern Pacific Railway.

WYOMING: SHOSHONE PROJECT.

This project, as developed to date, contemplates the diversion of a portion of the waters of Shoshone River, and the construction of an impounding dam at the head of the canyon through which the river flows. The reservoir thus

created will have a storage capacity of 420,000 acre-feet. When the project is completed, it will be possible to reclaim about 175,000 acres of irrigable public lands. A portion of this area, 122,000 acres in extent, is located on the left, or north, side of the river, and 53,000 acres on the right, or south, side, the whole being about 75 miles east of Yellowstone National Park, Wyoming.

The soil is productive, and hay, wheat, oats, barley, and the hardier vegetables can be produced abundantly with an ample supply of water. The lands are tributary to lines of the Chicago, Burlington and Quincy Railway. At the proper time, when the construction of the project is approaching completion, they will be thrown open to homestead entry by bona fide settlers under the homestead laws and terms of the reclamation act. Persons are strongly advised against filing entries prematurely, as the area to be benefited is now arid and incapable of cultivation. It is estimated that water may be delivered by the spring of 1908.

Contracts for construction work have been awarded as follows: On September 18, 1905, to Prendergast & Clarkson, Chicago, Ill., for Shoshone dam and auxiliary works; on September 27, 1905, to Charles Spear, Billings, Mont., for Corbett tunnel and auxiliary works. Construction work is well under way on outlet tunnel, temporary diversion works at the dam, and the Corbett tunnel. It is expected that at an early date proposals will be requested for the construction of a diversion dam across Shoshone River and for the first 9 miles of the main canal.

JANUARY, 1906.

DEPARTMENT OF THE INTERIOR,

UNITED STATES GEOLOGICAL SURVEY.

Withdrawal of lands under the reclamation act of June 17, 1902 (32 Stat. L., p. 388.)

1. The withdrawal of lands under the provisions of the reclamation act of June 17, 1902 (32 Stat. L., p. 388), a copy of which is appended, is principally for the purpose of making the extensive surveys and careful engineering investigations necessary to determine the feasibility of any particular irrigation project. Even if the project is feasible, only a portion of the lands withdrawn will be irrigated. The mere fact that surveys are in progress is no indication whatever that the works will be built. Until the surveys have been completed, it will be impossible to state how much water will be available, what lands will be watered, or whether the cost will be too great to justify the undertaking.

2. The fourth section of said act provides that the Secretary of the Interior "shall give public notice of the lands irrigable under such project, and limit of area per entry, which limit shall represent the acreage which, in the opinion of the Secretary, may be reasonably required for the support of a family upon the lands in question; also of the charges which shall be made per acre upon the said entries and upon lands in private ownership which may be irrigated by the waters of the said irrigation project, and the number of annual installments, not exceeding ten, in which such charges shall be paid and the time when such payments shall commence."

3. Until this public notice has been issued by the Secretary of the Interior, it will be impossible to give information concerning any particular tract or any of the details required by the public notice.

4. Homestead entries may be made for the lands withdrawn as irrigable under this act in accordance with the general laws and regulations relating to this class of entries. All the public lands under an irrigation project will be divided into farm units containing such area of irrigable land as, in the opinion of the Secretary of the Interior, will be necessary for the support of a family. These areas may vary in any one project from 40 acres to 160 acres, in accordance with the character of the soil and the relation of the lands to the irrigation system. Each farm unit will contain as nearly as possible the same average amount of irrigable land suitably situated for irrigation, and, if necessary, for drainage.

5. The entries are not subject to the commutation provisions of the homestead laws.

6. Actual and continuous residence on the land is required, in accordance with the homestead laws.

7. The entryman will be required to take water from the Government irrigation system and to pay in annual installments, not exceeding ten, the proportionate amount charged against the land included in his entry.

8. Before being entitled to a patent for the land, the entryman must pay the entire charges for the water, and must show that he has reclaimed at least one-half the total irrigable area of his entry for agricultural purposes.

9. A failure to make any two payments when due shall render the entry subject to cancellation, with the forfeiture of all rights under the act, as well as all money paid thereon.

10. Until the construction of the irrigation system has advanced to such an extent that water can be furnished for the irrigation of the lands, it will be difficult, if not impossible, to make a living upon them; but those filing will not on that account be excused from residing thereon, the homestead laws requiring that actual bona fide residence be established within six months from the date of the filing of the applications, and continuously maintained.

11. Failure to comply in good faith with the provisions of the law concerning residence will render the entry subject to cancellation.

12. No specific rulings have been made concerning the modification of the homestead laws as applicable to entries under the reclamation act. Except where modified by the terms of this act, the entries will be made in accordance with the general rulings concerning the homestead laws. Information concerning them can be obtained from the circulars issued by the General Land Office.

CHAS. D. WALCOTT, *Director*.

Approved, March 31, 1904.

E. A. HITCHCOCK, *Secretary*.

DEPARTMENT OF THE INTERIOR,

UNITED STATES GEOLOGICAL SURVEY,

RECLAMATION SERVICE.

Questions and answers relating to the reclamation law and its operations.

The following questions and answers have been prepared for convenience in replying to correspondents who seek information concerning the reclamation law and the operations under it.

The law is general in character and leaves details to executive discretion. Many important questions will not be decided until actual cases are brought to the attention of the Department, it not being customary in governmental affairs to give decisions in advance of the necessities of the case. Further, while the law authorizes the Secretary of the Interior to promulgate rules and regulations, it has not been deemed wise to attempt to make these cover future contingencies, but to permit progress to be made under the general conceptions of the law and not to run the risk of hampering the work by attempting to give definite instructions too far in advance; thus only such matters are passed on as are necessary for current business.

The questions given are such as are asked by most correspondents. The answers are based upon present conceptions of the law and its requirements and are, in many cases, not necessarily final; it is possible that in the future some of them will be modified or reversed.

CHARLES D. WALCOTT, *Director*.

HOMESTEAD ENTRIES.

1. Q. In what way can public land be taken under the reclamation law?

A. The only way in which land can be taken is under the terms of the homestead law, which requires actual settlement and cultivation.

2. Q. Can I take up a homestead under the reclamation law, and obtain title when I am earning a living in a near-by city?

A. You can not obtain a homestead unless you live on the land and make

it your home. Occasional absence is allowable, if some good reason is given, but you can not live elsewhere and claim a homestead.

3. Q. Is it necessary for me to live on the land more than once in six months?

A. Yes; actual and continuous residence is required by law; you must establish your home on the land and live there for the full term required.

4. Q. Must I move onto the land at once?

A. You are given six months from the time of making your entry to establish a residence, and before the end of that time you must be actually living on the ground.

5. Q. Is it sufficient to erect an ordinary claim shanty, with one door and window?

A. No; the claim shanty and nominal residence which may have sufficed under some conditions will not be sufficient on the irrigable land. An actual home, where you sleep and take your meals habitually, will be required.

6. Q. Can I enter 160 acres and then sell off parts of it?

A. You can obtain title only to a certain piece of land, which may be 40, 80, 120, or 160 acres, and you can not convey any title to this or to any portion of it until final certificate has issued for your entry. You may relinquish or give up a portion of it, and in that event some other person can make a new homestead entry, but you can not transfer to him any rights or privileges, and he must begin his term of residence as required in the case of a new entry.

7. Q. Must I live on the land if the water is not available?

A. Yes; after you make your homestead entry you must comply with the terms of the homestead law. No excuse will be accepted because of lack of water; if lands are entered before water is ready there is a presumption that the person making the entry does it for speculative purposes rather than for an actual home.

8. Q. How much land can I enter at first?

A. Under usual conditions there is no law to prevent your entering 160 acres at first; but this entry is merely preliminary, and will be cut down to 40, 80, or 120 acres, according to the plans finally determined upon. The entry will be subject to certain limitations, charges, and terms, which can not be stated until the contracts for construction have been let.

9. Q. What assurance is there that the land which I enter will be irrigated?

A. You can have no assurance that the land will be irrigated until public notice has been given. If you enter in advance of the public notice you make a speculative entry, wholly at your own risk, and without any guaranty or safeguard that water will be supplied, and with a reasonable probability that you may lose your homestead right.

WATER USERS' ASSOCIATIONS.

DUTIES AND POWERS.

10. Q. What are water users' associations?

A. They are associations of individuals claiming the right to the use of water and owning lands within the area to be supplied by the works constructed by the Government.

11. Q. Why are the associations formed?

A. They are formed in order to assure the Government that the landowners will apply for water from the irrigation works, and that they will so adjust the existing claims to the use of water that the administration of all the water available for the lands under the project, whether supplied from private or from Government irrigation works, shall be under one control, viz, that of the water users themselves. This organization is necessary in order that there may be supervision over the distribution of water to lands in private ownership, as contemplated by section 6 of the reclamation act.

12. Q. What is the form of organization?

A. The form of organization may vary in different parts of the country in accordance with local needs. A general form has been prepared which can be used in organizing such associations. Its principles have been approved by the Secretary of the Interior.

13. Q. What is required of persons joining such associations?

A. (1) They agree to turn over to the management of the association the water which they have heretofore appropriated, to be administered in connection with the additional water supply furnished from the Government irriga-

tion system. (2) They agree to make their former water rights, as well as the Government water rights, appurtenant to the lands irrigated. (3) They agree to pay the charges for water rights required by the reclamation act. (4) They agree that their land shall be security for the Government charge for water, and that such charges shall be a lien on the land which the association may enforce if they do not pay for the water. (5) They agree to dispose of the lands they own in excess of the limit of land in private ownership permitted to apply for water from the Government system.

14. Q. How is the association managed?

A. Directly by the water users themselves and through the officers elected by them.

15. Q. What is the connection between the association and the Government?

A. Before beginning construction the Government will make a contract with the association, in which the latter will guarantee the payment for the Government construction, and will agree to enforce collection from its shareholders, by means of the lien on their lands, if necessary.

16. Q. Does the shareholder derive any advantage from this lien?

A. Yes; it protects him against the possibility of being required to pay for a shiftless neighbor's water right, for without the lien the association would be required to assess each member for any deficiency.

17. Q. What is the form of organization contemplated by section 6 of the act, to which the management and operation of the irrigation system is to be turned over when the payments have been made for the major portion of the lands irrigated?

A. This can not be decided until such period approaches in the first project to be completed. The form of water users' association already discussed will probably meet the necessary requirements. In any event it will require few, if any, changes to meet the conditions contemplated in section 6.

WATER SUPPLY.

18. Q. How much water will be furnished to each water user?

A. He will receive his proportional part of the entire supply in the hands of the association, not in excess of the amount necessary for the proper cultivation of his land.

19. Q. What assurance has he of a sufficient supply?

A. The association is required to limit the lands represented by its shares to the area which the Government has determined can be cultivated to the highest efficiency.

20. Q. What will be the cost of the Government water right?

A. The smallest amount consistent with permanent work. Steel and concrete will be used where required. The largest part of the cost of ordinary irrigation systems—that is, the maintenance, which goes on forever—will be reduced to a minimum.

21. Q. How are former water rights affected by joining the association?

A. The reclamation act expressly protects vested water rights. By joining the association the owner of such water rights puts them in the care of the association, and the water is to be delivered to him as before, being included in the complete supply furnished from the Government system. His priority of water right remains intact, is protected by the articles of the association, and may be reasserted if ever there should be a shortage of water in the future.

22. Q. How are such prior water rights to be protected if the need should arise fifty years hence?

A. These rights must be definitely ascertained and made a matter of record as soon as the association can have the adjustment made. This adjustment can be made by mutual agreement or in the courts.

EXCESS LANDS.

23. Q. How soon must a man dispose of his excess land?

A. He will not be required to do so before the Government is ready to furnish the water, thus gaining the benefit of advanced prices resulting from the large expenditures of the Government and the sure prospect of water, and having without expense a good market for his land that he could have had under no other conditions.

24. Q. What is done to make certain that such excess lands are sold?

A. The owner must agree that if he does not sell them to a properly qualified

person by the time the Government water is ready the association shall have power to do so.

25. Q. Will the land be sacrificed by the association?

A. No; for three reasons: (1) Every officer and member of the association is a landowner, and a depreciation of land values is against his interest; (2) the time for making the sale is fixed by the Secretary of the Interior, who will give due consideration to the interests of all concerned; (3) the demand for land will probably be so great as construction approaches completion that large prices can be easily realized by the owner himself, and there will be little, if any, land to be sold by the association.

STOCK SUBSCRIPTIONS.

26. Q. If a tract to be subscribed for contains lands which are not irrigable, how many acres should be included?

A. The subscription should include the entire tract. The Secretary of the Interior will, by careful and expert examination, determine the irrigable area of each tract. The shares representing nonirrigable lands will be canceled, and the Government will make no charges against them.

27. Q. Can a man subscribe for a part of his land and leave the rest out of the irrigation system?

A. No; the association will accept subscriptions only when they cover the entire body of the land owned by the subscriber within the project. No single subscription should exceed 160 shares, but any person may make several subscriptions if he agrees to dispose of his excess lands located under the system.

LANDS IN PRIVATE OWNERSHIP.

WATER RIGHTS AND RESIDENCE.

28. Q. If I own a tract of land to which water may be brought by a Government ditch, how can I obtain a water right?

A. It will be necessary to become a member of the local water users' association and subscribe to all of the requirements of membership in such association, and afterwards to make application to the Government for a water right when it is ready to receive such.

29. Q. For what amount of land can water be had?

A. Section 5 of the law states that no right to the use of water for lands in private ownership shall be sold for a tract exceeding 160 acres to any one landowner.

30. Q. Can I obtain water for a full tract of 160 acres?

A. This matter is left to the Secretary of the Interior, and the acreage may, in his discretion, be reduced to 120, 80, or 40 acres, according to the surrounding conditions.

31. Q. Why can not water be had for more than 160 acres?

A. The object of the law is not merely to reclaim the land, but to encourage the establishment of homes by the greatest number of persons, and to bring about an intensive cultivation of the soil. It is necessary to cut down the land-holdings to such a point as will enable a large number of families to make a comfortable living.

32. Q. Can I, while residing in some other locality, where I am earning a living, obtain water for a tract of land?

A. You can not obtain a water right for your land unless you are an actual bona fide resident on such land, or occupant thereof residing in the neighborhood.

33. Q. What is meant by "the neighborhood?"

A. It is probable that it will be held that a person must live within such distance of the land that he can daily cultivate or care for it. This provision, relating to an occupant residing in the neighborhood, was drawn originally with reference to the conditions in Utah, where the farmers live in small communities and cultivate farms surrounding the villages. In this case the farms are all within an easy drive of the homes of the owners.

EXCESS LANDS.

34. Q. If I have a farm of over 160 acres for which I want water, what must I do?

A. You can, by joining the water users' association, and afterwards applying

to the Government, secure water for 160 acres or less, as the rule may be; but the remainder of the land can not have water unless it is conveyed by a deed duly recorded to some other person.

35. Q. Can I convey this to a relative or friend, and can he obtain water and then transfer the title back to me?

A. To secure a title to the water right the land must be conveyed by a deed duly recorded, and remain in the ownership of some other person for ten years or more. Such person must also be an actual bona fide resident on the land, or an occupant thereof residing in the neighborhood.

36. Q. If I own a piece of land and put a tenant upon it, will not this comply with the requirements of the law?

A. No; the law is explicit that the landowner shall be an actual bona fide owner and resident. It is not the purpose of the law to encourage landlordism or tenantry.

37. Q. If there are several children in a family, can the land be deeded in separate tracts to each of these children and water thus secured?

A. This might be done, if each individual is competent to be an independent landowner, but he must have title of record in fee and have an actual residence upon the land or in the neighborhood.

38. Q. What can be done in case of a man owning several hundred or thousand acres, or a trust company having large tracts?

A. Unless the person is an actual resident and occupant of the soil, he can not obtain any water rights, and the land must be left without any water supply unless it is conveyed to an actual bona fide resident, who may then apply for water.

39. Q. Can not any arrangements be made pending the time of disposal of the land?

A. Subscriptions will be received by the local water users' association, and the land can ultimately receive water when subdivided and sold.

40. Q. How can these lands be sold?

A. The owner can sell at his own discretion; but he must by trust deed to the association give it power to sell ultimately in small tracts to actual settlers who are qualified to comply with the Reclamation Act, unless this has been done by him when the Government is ready to furnish the water.

RAILROAD LANDS.

41. Q. In the case of railroad lands what arrangements can be made?

A. The railroads, as a rule, have agreed to put their lands on the market in small tracts, at a price of \$1.25 or \$2.50 per acre, to be sold on long-time payments, and subject to all of the conditions of Government land adjoining, title not to be passed until all of the terms have been complied with.

42. Q. What is the inducement to the railroads to dispose of lands in this manner?

A. The railroad corporations are more interested in securing immediate settlement and cultivation in small tracts than in obtaining a profit on the land; and in this respect their object and that of the Government is identical, viz, to bring about immediate settlement by the maximum population on the irrigated tract.

SALE OR MORTGAGE.

43. Q. Suppose that I sell a piece of land, take a mortgage on it, and before the expiration of ten years foreclose the mortgage and take the land, will not the title to water remain with the land?

A. No. You can not complete the right to the use of water unless you afterwards live upon the land, and have not applied for water right for other lands in excess of the limit fixed.

44. Q. How will these conditions be enforced?

A. By the articles of incorporation of the water users' association, that body being responsible for enforcement of the law as to its shareholders; also by contest before the land office, or through exercise of the power vested in the Secretary of the Interior.

45. Q. If a person trying to acquire a water right sells his land, or if he dies, does this forfeit the water right partly acquired?

A. Forfeiture does not necessarily follow, but the land must come into the hands of a person who will live upon the land, and who is otherwise qualified, and who does not already own rights to water for other lands.

MISCELLANEOUS.

46. Q. What is meant by "land in private ownership" as used in the act?

A. This includes all land not public at the date of withdrawal under the Reclamation Act. The Secretary of the Interior has held that for the purposes of this act a desert-land entry may be classed as land in private ownership; a homestead entry not made under the Reclamation Act will probably be classed similarly.

47. Q. May a desert-land entryman or his assignee apply for a Government water right?

A. Yes; but he must live on the land or in the neighborhood and relinquish to the United States any excess land in the entry.

48. Q. Will the time for making final proof on desert-land entries be extended?

A. No ruling has been made, but the Department will probably decide in harmony with its ruling allowing a desert-land entryman to apply for a water right.

This first gives briefly the location of the irrigation projects, and answers probably half of the general questions that come in. Several projects have been approved for construction since this circular was issued. A new circular has been sent to the Printing Office, but is not in type. Another line of questions is covered by a circular regarding the withdrawal of land. Another circular, in the form of questions and answers, gives information regarding entries, water users' associations, and lands in private ownership.

Mr. KENNEDY. When the Secretary of the Interior was before the committee the other day I asked him whether or not it was within the power of the Department or the Reclamation Service to furnish the committee with a clean-cut, concise statement showing the amount of irrigable land in each State, and in the several counties of each State, taking it rather as to States and counties than as to projects. My request was based upon demands made upon me, and I presume the same sort of requests have been made of other members of the House, for detailed information touching the amount of irrigable land in my own State and in the particular counties in the State, and I would like to repeat that question to you, as being more directly in charge of that work, as to whether you could furnish and put into this record such a statement?

Mr. NEWELL. It is possible; although to get it by counties would require so many assumptions that I personally would not like to attempt it. The question is a good deal like the one that is always asked, What are the mineral resources of the United States? How much mineral can we take out of the earth in each county? The conditions shift so rapidly as regards surrounding conditions that any anticipation of the future is extremely dangerous. The question is not how much land there is, but how much water can probably be obtained to put on that land. That, in turn, depends not on the amount that we see in sight, but how much can be stored.

Mr. MARSHALL. Would it not require a survey to show how much land you could reach with it?

Mr. NEWELL. We can store in certain places if it will pay to do so. If it costs \$50 an acre-foot to store it; it would not pay now, and yet it would pay for a town like Los Angeles.

Mr. KENNEDY. In reference to all your work here you have to make estimates and assumptions from time to time?

Mr. NEWELL. Yes.

Mr. KENNEDY. And these are done more with reference to the projects in the States, or particular parts of the States?

Mr. NEWELL. Yes.

Mr. KENNEDY. My suggestion was whether you could not in a general way furnish a statement grouping the land as to States and counties, and estimating and assuming where you could not give exact information.

Mr. NEWELL. We have published such tables frequently by States, but I have hesitated very much in splitting that into counties.

Mr. MARSHALL. The inquiry for that would seem to be so little that you could answer in any specific case an inquiry as to a county in a general way. I know from experience that when I am at home people come to me and say: "How much irrigable land have we in the State of Nebraska, and where does it lie, and what chance is there for the irrigation of those lands, and to what extent is there water to supply them?"

Mr. MARSHALL. They do not care what county it lies in. I know in my State we have two or three projects, and we know how much there is in each project, and what difference does it make whether it is in this or that county?

Mr. KENNEDY. You do not get the point of my inquiry. Strictly speaking, Nebraska is dependent for water on some of the projects that originate outside of the State. And the same is true in other instances. All that I am seeking to do is to put myself and also other members similarly situated in such shape that we can convey this knowledge to the people so that they will understand it. They do not understand it as to the project, but if you can tell them how much land there is in the State and where it lies and where the water comes from that will irrigate it, they will understand it.

Mr. NEWELL. I think that can be done for groups of counties, but for any particular county it must be greatly qualified.

Mr. KENNEDY. That is what I am getting at. I do not ask you to furnish something that you can not possibly furnish, but rather if you can furnish a statement along State lines, and giving a general statement as to what counties it lies in, so that as far as we go we can convey to our people that information. That is what I want.

Mr. NEWELL. I think that might be done.

Mr. KENNEDY. I will ask you, to the extent that you can do it, that it be put in the record as a part of the hearings.

MAP REPRODUCTION.

Mr. NEWELL. The next particular subdivision of the general administrative work is drafting and map reproduction. There is a great deal in that, as every project has many maps and plans prepared in more or less crude form, and they must be reproduced for the benefit of the public in general, and particularly for the benefit of the contractors.

Mr. MARSHALL. Can you make any use now, under the Director of the Geological Survey, of the force of the survey, which, of course, is a large one, composed of men who are doing this work for the Geological Survey? I presume that you do not duplicate their work if you can avoid it—that is, you can make use of a great deal of the work they have done before?

Mr. NEWELL. We do. The Geological Survey has some elaborate and expensive machinery, and we make full use of that, especially

in drafting and map reproductions. The Survey has a plant which is among the best in the world, and the work which is done for us is paid for exactly as we would pay an outside firm.

Mr. MARSHALL. You use their surveys and notes, even those taken ten years ago, do you?

Mr. NEWELL. Yes.

Mr. KENNEDY. Whatever that Department does for the Reclamation Service is charged to the Reclamation Service at just about what it would cost if done outside?

Mr. NEWELL. Yes.

Mr. MARSHALL. There is a great deal that was done years ago, or which is done from time to time, and all the cost of that has been paid by the Geological Survey, and if you wanted copies of that work you would pay for them?

Mr. NEWELL. Yes.

Mr. MARSHALL. You would not pay what it would cost to go out and make the originals?

Mr. NEWELL. No. In fact, the irrigation service in its growth has branched off until it is no longer a part of the Geological Survey.

Mr. MARSHALL. But there is a tendency in all these departments to duplicate work a great deal, and that is one of the things which should be avoided; and you certainly not only save time, but a great deal of money by availing yourself of the work that has been done heretofore by the Geological Survey.

Mr. NEWELL. That is a very powerful argument in favor of the Director of the Geological Survey continuing to be the director of the Reclamation Service. That organization has machinery and records that we avail of, and we save a great deal of money by being able to do so.

In this map reproduction the form is given in these sheets. Of course this reproduction of drawings requires careful work and a large outfit to do it economically and well. The printing of the specifications is done outside under contract by private printers. We found that we could get a great deal better control of the work and quicker work in that way than by having it done in the Government Printing Office. The average time required to get specifications printed at the Government Printing Office, based on 36 specifications, has been thirty-three and one-half days; the average time required to get specifications printed by private printers, based on 23 specifications, has been twelve days.

Mr. MARSHALL. You have no printing office in connection with your office, have you?

Mr. NEWELL. Yes, sir; but we have no authority to use it for other than map reproduction, so that we have the printing done outside.

Mr. MARSHALL. You do have a printing office?

Mr. NEWELL. Yes; but we can not use it for anything but printing titles of maps and matter relating to maps.

The CHAIRMAN. Do you find that you get this work done quite as cheap outside as the Government Printing Office would do it?

Mr. NEWELL. The average cost per page of 36 specifications printed at the Government Printing Office was \$1.90; the average cost per page of 23 specifications printed by private printers has been \$1.56. Sometimes the charges of the Government Printing Office are less than

commercial rates and sometimes more. We have found that it is more satisfactory to get bids from outside.

The CHAIRMAN. They do not seem to have a fixed schedule of charges?

Mr. KENNEDY. How do you account for that?

Mr. NEWELL. I do not know.

Mr. MARSHALL. He says, as he does in his statement, that it is on a different basis.

Mr. NEWELL. Much of the map work in connection with the specifications is in three colors, for which the Geological Survey has a special equipment, probably the best in the country.

The CHAIRMAN. That three-color map work is done in the Survey Office?

Mr. NEWELL. In the Survey, and a bill is rendered for it as in the case of an outside firm.

The CHAIRMAN. You pay approximately what it costs to do the work?

Mr. NEWELL. What it costs to do the work—for labor and materials.

Mr. KENNEDY. I understand that they have not a fireproof building there to preserve what they have.

Mr. NEWELL. They have over a million dollars' worth of copper plates in a very exposed place.

Mr. KENNEDY. And they are probably paying 10 per cent interest in the rent on the buildings they are in, to use them.

Mr. NEWELL. In fifteen minutes, a short time ago, we lost over \$15,000 worth of original material.

Mr. KENNEDY. That is a thousand dollars a minute.

Mr. NEWELL. Yes; the fire was up near the roof of the Geological Survey building. If it had been in the lower stories the whole building would have gone.

The CHAIRMAN. There is occasionally a loss of some of these documents and plates where the loss would be difficult to compute, because it would be practically impossible to reproduce them, would it not?

Mr. NEWELL. Yes, sir. Among the material destroyed in this fire was an original drawing which had been used in a lawsuit in the city of Worcester, Mass. On the testimony of the man who made that drawing the city is reported to have saved a million dollars in a water suit. If that drawing had been destroyed previous to the suit the city might have lost its case.

LAND AND LEGAL MATTERS.

The general administration of the land and legal matters is under the charge of Morris Bien, who is assisted by a number of men, as shown on the list. He and his assistants pass upon the reports on legal matters and upon all questions of purchases of land. They handle all details of that kind, and also oversee all matters connected with the specifications and the interpretation of them. All the specifications are in two parts; first, the general specifications, which apply to the work in general, and next, the detailed specifications, which apply to the particular piece of work. There are many points of law which arise in connection with the interpretation of specifica-

tions and in regard to the purchase of property, which must be handled both in the field and in the office.

In purchasing land it may be said that the general terms being fixed upon by the engineers in the field, by the supervising engineers, or others, then the abstract of title is prepared, with a blank form of deed. Those are submitted to the district attorney for his opinion.

Mr. KENNEDY. That is, to the district attorney of the particular State?

Mr. NEWELL. Of the particular State; the United States district attorney. He passes upon them and generally finds defects, which are corrected, and he again looks them over.

When the district attorney has them to his satisfaction, they are sent on here, and Mr. Bien goes over them, using the experience that he has had and that of his assistants, particularly from the Land Office side. Then the papers are passed on through the Director to the Secretary of the Interior for reference to the Attorney-General for the Interior Department, whose decision, so far as we are concerned, is law on all matters. If title is satisfactory and the conveyance is in proper form, it is returned to the field for execution by the vendor of the property, and a claim is presented to the Treasury for payment to him.

Mr. MARSHALL. What is this for—for lands for the sites of dams?

Mr. NEWELL. For land for the sites of dams, and rights of way for reservoirs and canals.

Mr. MARSHALL. Rights of way for ditches?

Mr. NEWELL. For ditches, yes, sir; except where right of way has been reserved to the United States by the act of August 30, 1890. (26 Stat., 391.)

Mr. KENNEDY. Suppose that you can not come to terms with the owner of the land you require, what is the usual procedure to acquire it?

Mr. NEWELL. We have in reserve the clause of the reclamation act for condemnation. So far we have found it necessary in only one case, in which the Secretary of the Interior has recently requested the Department of Justice to bring suit. We try to make an agreement with the landowners to sell at reasonable rates. There are always one or two who hold off to the last, but persuasion and patience generally has brought them to a proposition which seems fair to all parties.

Mr. KENNEDY. And the knowledge that you can use the power to condemn results usually in bringing the obstinate to time?

Mr. NEWELL. Yes; we explain fully that we do not want to invoke it, and that we wish to have good feeling all around, but we can not afford to pay anything unreasonable, but are willing to do anything that is reasonable, and we ask the owner to consult his friends. Usually there is a water users' association, and we ask them to take it up with the man and try to produce in his mind the feeling that we desire to do business on a fair basis; that we are in no particular hurry, but sooner or later it must come up for condemnation if we can not come to any other possible agreement on a friendly basis.

Mr. KENNEDY. If you had to resort to condemnation proceedings, you would institute them in the Federal court through the particular district attorney of that district.

The CHAIRMAN. Would you institute them in that way? Would you not institute them in the State courts in the regular way in which a suit for condemnation would be instituted by an individual?

Mr. NEWELL. In the Federal courts, following, however, the procedure customary in that State.

Mr. KENNEDY. Do you know, Mr. Chairman, whether there is anything in the reclamation act particularly providing for that?

The CHAIRMAN. There is a clause in the reclamation act authorizing the Secretary of the Interior to condemn. I am not an attorney, and therefore I hesitate about giving an opinion on that subject; but it has been the opinion of the attorneys generally, I think, that that was simply in the nature of a direction and authority to the Secretary, and that his procedure under it would not be under Federal statute, or in the Federal court, but in the same manner and through the same channels that an individual would proceed to condemn. In other words, we have a statute in our State under which the property could be condemned by an individual. The reclamation service, I assume, would proceed in the same way.

Mr. NEWELL. It is in clause 7 of the act of June 17, 1902.

Mr. COLE. Have the Federal courts jurisdiction over this?

The CHAIRMAN. That is a matter which is in question, but most of the lawyers that have discussed that matter have been of the opinion that I have stated. In fact, that was one of the arguments against the reclamation law—that the Federal Government had no authority to condemn for these purposes; and the answer to that was that this legislation was not necessarily intended to invoke the power of the Federal Government for condemnation, but was simply a direction to the Secretary of the Interior, and conferred power on him to proceed as an individual would proceed in your State, for instance, under the laws of the State, to do this thing. That is my personal opinion.

Mr. COLE. He has authority to invoke the law of the State in condemnation proceedings?

The CHAIRMAN. Yes; to proceed as anyone else would.

Mr. NEWELL. So far we have been very fortunate in avoiding condemnation suits, except in the one case mentioned. We have closed hundreds of purchases by mutual agreement.

Mr. MARSHALL. Do you get any right of way wider than the ditch?

Mr. NEWELL. That depends on the circumstances. If it is simply for the ditch, we may obtain a right of way 50 feet on each side of the ditch. It is not unusual for a man to say "I will sell you the whole farm, but I will not sell you the right of way, because it will cut my land up, and it will be useless to me."

Mr. MARSHALL. What do you do in those cases?

Mr. NEWELL. We hope ultimately to get from Congress authority to dispose of those irregular lots.

Mr. MARSHALL. Is a very large amount of money going into these lots?

Mr. NEWELL. Not very much. The amount is given on page 4 of this annual report.

The CHAIRMAN. Quite recently I have had this suggestion made by a number of people, who claim that they are disposing of land in the Pathfinder Reservoir and have unperfected claims. Their suggestion is that we have legislation whereby when they can sell to the Government their unperfected claims, and they shall not lose their

homestead rights, but may be authorized to take homesteads elsewhere. Do you think that legislation of that character might make it easier in some instance to contract with people?

Mr. NEWELL. I think it would. Any legislation which will give a man a right of exchange will be in that direction.

The CHAIRMAN. For instance, I have a letter, which I received a day or two ago, on that line, and I have had half a dozen from that region. The statement of this man was that he had an unperfected homestead entry, and if he was to lose his right, while your men had offered what he believed was a fair price for his property, yet it would not compensate him for his loss of the right to get a home.

Mr. NEWELL. We have a number of those cases where a man is in the bottom of a reservoir site. He says, "I would be glad to give you that land for an equal quantity of land outside, because I want to get some of the reclaimed land." We say, "We can not do that. We must make a settlement with you on a cash basis."

The CHAIRMAN. If he could make another entry, it would make it very much easier to do business with you?

Mr. NEWELL. Yes; elasticity of that kind would make it easier.

The CHAIRMAN. I think I shall introduce a bill on behalf of the committee along those lines, provided you think it would be helpful, and it seems to me it would be so, from what these people have written about the situation in the Pathfinder Reservoir.

Mr. NEWELL. I think it would be helpful to get some elasticity in these matters, and also in the size of these units which we can give these people, especially where their holdings are cut diagonally by big canals. It is a hardship to be compelled to take farm units, half of which lies on each side of a main-line railroad or canal.

Mr. REEDER. Is it advisable to give them a right to make a unit less than 80 acres?

Mr. NEWELL. Yes, sir; very desirable. It is a great hardship to be compelled to take as a farm unit one of these irregular lots.

The CHAIRMAN. You may work that out with the Land Office without legislation, through your men in the field. As I understand it, if I am not misinformed, the Government can sell any tract of land that has been described in the surveys and has been subdivided. Now, they have authority, I assume, to further subdivide where there is necessity for it. Therefore, if they authorize Mr. Newell's men in the field, his deputy surveyors, to further subdivide, and then those further subdivisions can be entered in the records of the Land Office, that would obviate the difficulty. Your men would have to be deputy surveyors, anyway, to subdivide those lands, and if those subdivisions were then marked on the plats in the Land Office, that would be all that would be required. I think it would be a good thing if you would take that up with the Land Office soon, and officially inform the committee whether, in your opinion and in the opinion of the Commissioner of the General Land Office, further legislation is necessary.

Mr. NEWELL. The difficulty is that the land is entered, and the moment it is entered it practically goes out of the hands of the Land Office as far as resurvey is concerned. What we need is the privilege to readjust, with the consent of the entryman, the boundaries of

the entry. We can cut it from 160 acres to 80 acres, but we can not alter the boundaries.

Mr. KENNEDY. In other words, you are bound by the Government subdivision?

Mr. NEWELL. Yes.

The CHAIRMAN. At the time the entry was made?

Mr. NEWELL. Yes.

The CHAIRMAN. Now, the Land Office holds that they could not subsequent to that time mark a certain tract as a lot?

Mr. NEWELL. Yes; that is as I understand it. The Land Office has disposed of it and has nothing further to do with it. In effect it is already entered.

The CHAIRMAN. That condition does not exist with regard to the particular place that we were talking about the other day?

Mr. NEWELL. No, sir; the Huntley project, because that is Indian land.

Mr. REEDER. I think the matter of giving the opportunity to cut the land below 80 acres, for instance, in the Yuma Valley is essential. The people do not really need as much as 40 acres.

Mr. NEWELL. It is a hardship, and it is liable to ruin many men.

Mr. REEDER. I think all those matters might be put in the same bill.

The CHAIRMAN. I think that might be done.

Mr. MARSHALL. The minimum now is 40 acres?

Mr. REEDER. Yes.

Mr. MARSHALL. If I have a 40-acre tract along a ditch can I not sell it?

Mr. NEWELL. No, sir; if you want to get water under the reclamation act you must live on it and cultivate it.

Mr. MARSHALL. Can I not sell it?

Mr. REEDER. No; you can not convey a title.

Mr. KENNEDY. And you have to pay a tax on the whole 40 acres?

Mr. MARSHALL. You mean the water tax?

Mr. KENNEDY. Yes.

The CHAIRMAN. You could do this, and I assume it is done in some cases: A man having made a 160-acre entry can say to another intending settler who comes along, "Sooner or later I shall have to reduce my entry, and I will reduce it right now by relinquishment if you will give me something for the relinquishment. If you will pay me for it, I will relinquish 80 acres of this tract, and I will do it right now, and you can make your entry."

Mr. NEWELL. Yes; those relinquishments are selling for from \$300 to \$500 to-day.

Mr. MARSHALL. But you can not relinquish anything smaller than the legal subdivision?

Mr. NEWELL. No, sir.

Mr. KENNEDY. Forty acres is the lowest limit?

Mr. NEWELL. Yes.

Mr. MARSHALL. Suppose that I go on and get an absolute title, could I not divide it then?

Mr. NEWELL. Yes.

Mr. MARSHALL. I have to keep up my payments?

Mr. REEDER. I know that in Canyon City we have some relatives

who have 6 acres, and they have employed one or two hired men—they are raising fruit—but, as a matter of fact, they do not need over 3 acres.

Mr. KENNEDY. Our reclamation act is framed all right for ordinary farm projects, but it contemplates too many acres when you come to raise fruits and celery and other things of that class?

Mr. NEWELL. Yes.

The CHAIRMAN. You have reached the point on some of the projects, no doubt, where you have given notice to reduce the size of the entries?

Mr. NEWELL. Yes.

The CHAIRMAN. Are the settlers responding to that pretty promptly?

Mr. NEWELL. Yes; as a rule they reduce immediately. There has been some delay in the Carson-Truckee area. I think, under the new land-office men, when they get into working order the subdivision will proceed almost automatically and without any difficulty.

The CHAIRMAN. There has been no disposition among the settlers to resist the action of the Department to compel them to reduce?

Mr. NEWELL. No, sir.

The CHAIRMAN. You simply serve notice on them that they can not retain over a certain acreage?

Mr. NEWELL. Yes.

The CHAIRMAN. And call upon them to designate the portion of the entry that they desire to relinquish?

Mr. NEWELL. Yes; or rather they are served with a notice that they will be cut down, and we do not say how much. Later we file with the Department for approval, if satisfactory, a map showing our idea of how the lands should be subdivided, and how the water can be brought best to each farm unit. So far there has been no protest from the farmers about the farm units.

The CHAIRMAN. If you divide along an east-and-west line 160 acres into two 80's when the settler reduces you expect him to reduce along the lines that you designate?

Mr. NEWELL. Yes. We generally show the settler that he can get water better, that it is to his interest, that we have no interest except to serve the public, and it has been so obvious that, so far as I know, there has been no reasonable complaint.

Mr. KENNEDY. Now, you have spoken of the sale of relinquishments. After you have designated that a man occupying 160 acres can retain only 80 acres, has he any right to sell the other 80 acres and let his purchaser come in and get his preferred right?

Mr. NEWELL. He has no right.

Mr. MARSHALL. He does not get any right.

Mr. NEWELL. But this is the custom. If you have 150 acres you may say to me, "I am going to relinquish half of this, and we will go together to the land office, and when I lay down my relinquishment you will lay down your filing on top of it. For a consideration I will do that."

Mr. KENNEDY. That can be done even after you serve the notice?

Mr. NEWELL. Yes; there is a very lively trade in relinquishments because of the strong demand for the land. As a rule many of the first entrymen have not desired to live upon the land, and when they

saw the water coming they have sold out their holdings or relinquished them.

The CHAIRMAN. Have there been many changes in the Truckee-Carson outright, for the whole amount of entry, do you know?

Mr. NEWELL. There are a good many. We have notice every week of the changes, and it is my impression that there are many changes going on.

The CHAIRMAN. Do you understand that in the majority of those cases there has been something paid for the relinquishment?

Mr. NEWELL. That is a matter of common report, that there is something paid, and the prices placed run from \$300 to \$500.

Mr. KENNEDY. For how much land?

Mr. NEWELL. For a choice lot, whether 40 acres or 80 acres. That is current rumor. It is a matter of individual negotiation.

The CHAIRMAN. You have made the final announcement of the cost per acre?

Mr. NEWELL. Yes; \$26 an acre.

The CHAIRMAN. So that the amount to be paid is known and understood?

Mr. NEWELL. Yes.

The CHAIRMAN. When do you contemplate calling for the first installment on those lands?

Mr. NEWELL. If the water is put on in April we will call for the first payment in December.

The CHAIRMAN. Of this coming year?

Mr. NEWELL. Yes. As a matter of fact, we failed to get much water on in April, owing to the exceedingly bad March that we had, and probably we will not get large returns until 1907.

The CHAIRMAN. You did not get any water on the Nevada lands this year?

Mr. NEWELL. We got some on, but not in such a way that we could formally notify all the people that we had water. There was a great deal of unexpected trouble in the way of storms and labor complications.

The CHAIRMAN. Did you have very much difficulty there with your new structures—that is, not your larger structures, because of course they are of concrete and stone and are substantial, but I mean with your smaller structures, when you turned the water in?

Mr. NEWELL. Just about what we anticipated. We wet them slowly. We took from two to three months to wet the new work.

The CHAIRMAN. About the usual amount?

Mr. NEWELL. About the usual amount of difficulty. There were gopher holes in places in the earthwork, and it required careful attention for the first few weeks to see that nothing went out.

The CHAIRMAN. Is the soil there of about the usual character?

Mr. NEWELL. It is more alkaline and there are more sand hills. But it behaved very well, and we are well satisfied with the results of the work.

The CHAIRMAN. Have all the lands which are to be immediately irrigated under the Truckee-Carson been entered?

Mr. NEWELL. There are 103 farm units that are open to entry, for which the land-office officials will receive the entries. They are portions of farm units on which the entrymen have been notified that they will be cut down.

The CHAIRMAN. Is the instruction of the land office to receive entries immediately upon relinquishment?

Mr. NEWELL. We understand it is.

The CHAIRMAN. As under the usual form of relinquishment?

Mr. NEWELL. Yes. In the Minidoka project, where the land-office officials understood the matter a little better, the thing went on automatically, and there was no trouble.

The CHAIRMAN. In the Truckee-Carson how many 40-acre farm units are there?

Mr. NEWELL. There are very few 40-acre units. Most of them are 80 acres or 120 acres, because most have sand dunes on them. We will make a 120-acre farm unit and say in that there are 35 acres of sand dune, which we consider nonirrigable, which may be leveled at sometime in the future, and there are 30 acres of first-class irrigable land and 20 acres of second-class irrigable land and then some bad alkaline, so that in every tract we have made a map of the first-class irrigable land that will support a family.

The CHAIRMAN. Then what do you call the farm unit there of first-class irrigable land—80 acres?

Mr. NEWELL. Approximately 80 acres.

Mr. KENNEDY. That is, supposing the whole 80 acres was irrigable?

Mr. NEWELL. Yes, sir. It is a very complicated situation, because we have a little first-class land, a good deal of second-class land, and some third-class nonirrigable land; so that we have to select out of the half million acres which is theoretically irrigable 300,000 acres which may be ultimately irrigated.

Mr. KENNEDY. Supposing that you make the farm unit on a certain project 120 acres and there are only 80 acres of that actually irrigable. Is your water charge based on the amount of land in the unit which is actually irrigable or on the entire 120 acres?

Mr. NEWELL. On the actual irrigable land. We throw in the rest of the land as not worth considering. And the application for water right covers that very carefully.

Mr. KENNEDY. So that the right is limited to the actually irrigable land?

Mr. NEWELL. Yes.

Mr. MARSHALL. Why does not that fit my case that I mentioned a while ago? Why could not these people run their lands back on the bluff and have 80 acres of irrigable land?

Mr. NEWELL. That is what we will try to do, to give them 80 acres of land, and at the same time also enough nonirrigable land so that they will have room for corrals, etc.

Mr. MARSHALL. Are you considering that?

Mr. NEWELL. Yes; and we are classifying them very carefully.

Mr. KENNEDY. Suppose you sell a man, or a man gets, 120 acres of land, and 60 acres of that are irrigable and he pays for water for 60 acres of land.

Mr. NEWELL. Yes.

Mr. KENNEDY. How do you prevent him from leveling this land and extending the water over 80 acres?

Mr. NEWELL. Our water-right form says "the water supplied in pursuance thereof to be used for the irrigation of and to be appurtenant to ——— acres of irrigable land, as shown on plats on file in the

land office." If he by thrift and careful management makes it extend over more land, we are not going to bother him on that account.

Mr. KENNEDY. If he covers more land with the same amount of water?

Mr. NEWELL. Yes.

Mr. KENNEDY. And you measure the water to him?

Mr. NEWELL. Yes.

Mr. KENNEDY. And you think that if he goes on and covers 20 acres more and can do it with that water that he pays for, extending his cultivation to the other 20 acres, that he ought to have the benefit of that, and you do not object to it?

Mr. NEWELL. He should be allowed to do it. That is what we want.

The CHAIRMAN. As a matter of fact, it is an exceedingly wise arrangement to compel economization of water. The result of that will be when your entire system is under irrigation that if there is a shortage of water at any time, those controlling the water supply cutting everybody down to the amount that they are actually entitled to, the best farmer is the man who is going to do the best, and the man who wastes water is the man who is going to be in the worst condition.

Mr. NEWELL. Yes.

Mr. REEDER. It is true—I do not know whether you make any calculation for it—that for a number of years it takes less water for a certain tract of land than it did during the previous years?

Mr. NEWELL. Yes.

Mr. REEDER. You do not make calculation for that in your contracts for water?

Mr. NEWELL. In our agreements we do, very carefully, but it is to be presumed that for the first few years we will give the land a thorough wetting.

Mr. REEDER. Then the amount of water that you give a man for a 60-acre tract would not water that for the first year or two?

Mr. NEWELL. Not under the local distribution; but they will be able to make their own local distribution. We want to keep out of that as much as possible.

INSPECTION AND COST KEEPING.

As a rule Government institutions keep very few records of what things actually cost. It is usually sufficient to know that they have so much appropriation, and they spend it all, and that it has been spent in conformity with law; but in this work of the Reclamation Service, where we must get back every dollar, we must know where every dollar has gone in order to do it in a way which is satisfactory, and we have therefore introduced the best system of apportioning costs in the work.

In the inspection of the work we have gone into a good deal of detail in having men inspect the work on the ground, not only making inspections of the accounts, but to see whether we are getting what is paid for. The inspectors go into every minor detail of the construction as well as the management of affairs.

Mr. KENNEDY. About how large a bookkeeping force have you here in Washington?

Mr. NEWELL. We have here in Washington five or six bookkeepers. The principal part of the bookkeeping, however, and of the cost keeping is in the local offices. At the Salt River office in Roosevelt we had six bookkeepers, because of the fact that we are running a cement mill, with its bookkeeping, also a freight line, with about a million pounds of freight a month, and a power plant and a blacksmith shop and hospital, and we were caring for about 2,000 men.

Mr. KENNEDY. About how large a force do you have through the entire service, or do you know that?

Mr. NEWELL. About 2,000 men at present.

Mr. REEDER. This freighting is by wagon, and extends out for 60 or 70 miles?

Mr. NEWELL. Yes, sir. We let a contract first for all this freighting, and then if the contractor can not fulfill his contract we must take the work. The heavy freighting we have been obliged to do ourselves, building our own wagons. We have the heaviest wagons in that country, which handle 10-ton gates, and so on, that can not be handled by the contractors.

Mr. KENNEDY. In connection with the accounts, how are the salaries of the officials and the employees fixed?

Mr. NEWELL. That is, the amount of the salaries?

Mr. KENNEDY. Yes.

Mr. NEWELL. The amount of salary is recommended by the Director of the Geological Survey to the Secretary of the Interior and is fixed by the Secretary, as a rule. There are some appointments which are made by the Secretary, in which presumably he has taken the initiative.

Mr. KENNEDY. But as to all important positions the salaries are fixed or eventually passed on by the Secretary?

Mr. NEWELL. Yes; as a rule the men have been taken into the lower positions and advanced on their demonstrated merits, and salaries paid that will keep them, if we can keep them. Of course many men are leaving for other employment.

Mr. REEDER. Who set the salary of this consulting engineer?

Mr. NEWELL. That was set by the Secretary.

Mr. REEDER. Not at the suggestion of the Director of the Geological Survey?

Mr. NEWELL. I do not think that the Director was consulted about it.

Mr. KENNEDY. Taking the consulting engineers, under the head of expert engineers, these men do not give their entire time to the reclamation work?

Mr. NEWELL. All of them do so, with the exception of George Y. Wisner, who is a man of broad reputation and who was appointed by the President, subsequently, to the International Waterways Commission, which consists of three American members and three Canadian members; so that he by special authority devotes part of his time to that work, and is paid for it.

Mr. KENNEDY. The others devote their entire time to it?

Mr. NEWELL. Yes; I think it is wise that all the men do, because our work is so exacting. We should also be relieved of any question of private work or interest interfering with the Government work.

Mr. KENNEDY. A year ago I remember you were looking for a bookkeeper. Have you found one?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. Have you since found one and perfected your system?

Mr. NEWELL. Yes; we had a competitive civil-service examination, and about 200 passed. We selected the man, N. E. Webster, jr., at the top of the list. With his help we have perfected a system of bookkeeping which is probably as good as, if not better, than any in the Government service.

Mr. KENNEDY. What salary does he receive?

Mr. NEWELL. Two thousand two hundred dollars.

Mr. MARSHALL. In doing that, do you think that one man could make up a system of that kind? Did he take the advice of anyone?

Mr. NEWELL. He took the advice of many men in Government service, and particularly the advice of experts who were employed by our contractors. He is now chairman of the subcommittee on cost keeping for the Government, a part of the President's commission on business methods.

Mr. MARSHALL. Your bookkeeper is?

Mr. NEWELL. Yes. That subcommittee brings together the expert bookkeepers or accountants of the Government and enables them to exchange opinions.

The CHAIRMAN. You are pretty well satisfied with your present system of accounts and cost keeping?

Mr. NEWELL. Yes; we are seeking to improve it at all times.

The CHAIRMAN. When the Secretary appeared before the committee he stated that suggestions had been made that expert accountants be employed with a view of further perfecting the system of cost keeping.

Mr. NEWELL. Yes, sir. That grows out of a request made to him to authorize the employment for a few days of an expert accountant to visit some of our larger works with our men and see whether we could still further simplify and unify the entire system. Our system now, I think, is rather complicated. We have a great many details, and I want to reduce the number of bookkeepers without reducing the number of safeguards and checks.

The CHAIRMAN. To simplify the system if possible?

Mr. NEWELL. Yes, sir; to simplify the system if possible.

The CHAIRMAN. You feel now that the system is perfectly safe and that the results you finally obtain are satisfactory, but you might possibly obtain just as satisfactory results by some simpler methods?

Mr. NEWELL. Yes; it is more than safe. The checks are so numerous that I believe an expert accountant educated in modern business methods could show us short cuts. For example, one of the contractor's experts, who was brought out to audit the contractor's books in our office, showed us some short cuts which were perfectly obvious when he showed them to us, and which saved us four bookkeepers.

I know that an expert in engineering can almost at a glance show something which you might be years in discovering. That is his business. Our suggestion to the Secretary was that as we had looked around at all the accountants that we know, and found several men who might be satisfactory, that he permit us to employ one of these men to go into the field and visit two or three of our larger projects with our principal bookkeeper. Those two men, one representing

the best commercial practice and the other the Government methods, could in a few days or a few weeks on the ground simplify a number of details without reducing the safety of the work. I am a thorough believer in experts in every line, and in getting the best men that we can. I think the Secretary will authorize that to be done.

Mr. MARSHALL. When you got this present organization did they go back and cover the field from the beginning, do you think, as well as it was possible to do so? Of course you did not have anything on that to start with.

Mr. NEWELL. We had more or less a crude system of bookkeeping to begin with. Still, it relates largely to the original surveys and investigations.

Mr. MARSHALL. Yes.

Mr. NEWELL. Our present system is perhaps a little too elaborate. For instance, every item is distributed into any one or more of 81 subheadings.

Mr. MARSHALL. I have had considerable experience in preparing books for various businesses, and my experience of thirty years has taught me this, that it is not at all necessary to have an elaborate system in order to have an accurate one and to get results. In fact, there are more short cuts to be had in bookkeeping than in anything that I know. You can take any ordinary commercial bookkeeping and do away with three-fourths of the work and get better results without sacrificing a single thing, and I have not any doubt that it is true here, and these expert accountants will do it.

Under this head of land there is a thing that has been worrying me a good deal, and that is this question of whether you believe that you have guarded yourself in the legal department services so completely that you will not have no end of legal complications when you come to enforce the collections of these annual payments? Are you going to have lawsuits without end and in the end get beat out on some of them? If it does work out it looks to me as though it would be the most remarkable thing of that kind that ever was.

RETURN OF RECLAMATION FUND.

Mr. NEWELL. It has been a source of great concern to us, and we have studied every possible combination that we can anticipate. I think that we have guarded every point, but there may be points of weakness. We recognize that it is the test of the whole matter to get this money back into the fund.

Mr. MARSHALL. I am not a lawyer like my friend Mr. Mondell, he not having studied law and not claiming it as his profession, though he is a lawyer, and I would rather have his advice than that of most lawyers—

Mr. MONDELL. Thank you.

Mr. MARSHALL (continuing). But is there any way by which you could get one or two test cases without arousing too much antagonism? Is there not some scheme which could be devised by which you could get through the courts a test of one or two of the vital things involved?

Mr. NEWELL. We hardly know of any as yet. The contract which

the man signs to receive water has been passed upon by all the legal authorities of the Government.

Mr. MARSHALL. By everybody but the courts?

Mr. NEWELL. By everybody but the courts; and so far as I know there has not been found any case that we could bring before a court at the present time.

Mr. MARSHALL. There is no such thing as bringing a hypothetical case, is there?

Mr. NEWELL. I do not think there is.

Mr. KENNEDY. It is true, is it not, that in the event of refusal to pay the Government could shut the water off?

Mr. NEWELL. That is the presumable club which can be held over the man. We have tried to guard the reclamation fund in two ways. We first have an agreement with the man himself. Then there is the agreement with the water-users' association which stands behind the man, and unless the entire association or a majority of it refuses to abide by the agreement the defaulting minority can be handled, and we hope will be handled, by the association itself.

Mr. MARSHALL. When a man pays for five years on his land he acquires an equity in that land.

Mr. KENNEDY. But if he goes into court to compel the water supply to be continued to his land, he must stand ready to pay what he has agreed to pay. I will say, without going into detail, that my understanding has always been of this service that the Government stood there with the right to cut off all supply if default in payment was made.

Mr. MARSHALL. The Government really does not have much to do with it. They are acting as trustee for the water users' association when it comes to collecting this money.

Mr. KENNEDY. As Mr. Newell says, it is with the water users' association, and if that association fails to live up to the agreement, I do not see why the Government can not step in.

Mr. MARSHALL. You are a lawyer, and you know that there is nothing harder than to get rid of an equity, no matter how flimsy, or on what ground it is based.

Mr. KENNEDY. Yes; but in this case while the water users and the water users' association have a right to the use of the water, they are under the corresponding obligation to pay.

Mr. MARSHALL. Yes.

Mr. KENNEDY. And I think the chairman will bear me out in the proposition that when you have the right to cut off the water naturally no one will ask the water users' association to go into court to compel the delivery of water unless they stand ready to pay.

Mr. MARSHALL. I did not mean to go into it so far; but I think it is a big question.

The CHAIRMAN. I assume that this discussion has reference to the land in the hands of private owners.

Mr. KENNEDY. Yes.

The CHAIRMAN. So far as the Government is concerned, there can be no question there, provided the land and the water right is worth what the Government must receive to be reimbursed.

Mr. KENNEDY. Yes.

The CHAIRMAN. That being true, the Government is perfectly secure. The difficulty, as I see it, on land in private ownership—

Mr. MARSHALL. That is what I am talking about.

The CHAIRMAN (continuing). Is that in some cases the owner may refuse to pay, and be perfectly satisfied so long as the condition remains in statu quo, with his lands unreclaimed, waiting until the time when the general values have increased so that he can better afford to pay. Now, the question in your mind is whether or not in the meantime the Government can enforce against him to the extent of canceling his title and taking over the land if he refuses to pay.

Mr. MARSHALL. Yes.

The CHAIRMAN. Of course, ultimately, the Government must be paid or the man does not get water for his land; but that might lead to a long-drawn-out deferment of payment.

PUBLICITY.

The CHAIRMAN. Going back again to the matter of correspondence and records, in your division of correspondence and records, you have your bureau of publicity, if I may so style it. As I understand it, it is your policy to give to the press from time to time such information with regard to the progress and development of your work as you think the public ought to have in order to keep informed as to what is being done—that is, that intending settlers and those interested in the land themselves, and the work, may be informed; and further, that the general public may be kept informed as to the progress and development and character of this work which the Government is carrying on, and that through that division you send out this information for the use of publications generally that desire to use such information.

Mr. NEWELL. As soon as any important action is taken by the Secretary and we are authorized to make it public, a sheet is prepared on carbon paper, many copies being made, and they are hung up on a hook at the entrance to the office. The newspaper men come regularly every day and take off of the hook such things as interest them. In that way we give out practically to millions of readers every day the matters of progress. Then from day to day special writers come to the office representing journals, Sunday editions, and so on, and obtain from us other details or borrow photographs of the work and obtain facts concerning its progress. They ask for write ups, as they call them, and as far as possible we supply the information. It is exceedingly important, as the chairman says, to make public every action and every day to give that information so that there will be no possibility of misunderstanding the work.

Mr. KENNEDY. That is the policy of almost every department and almost every bureau of the Government, is it not?

Mr. NEWELL. It is not. It is rather a new policy. I can remember the time when it was not considered proper or advisable to give any information whatever.

The CHAIRMAN. As a matter of fact, we have heard quite recently a great deal of criticism of the so-called press bureau, with which criticism personally I have no sympathy at all. I think there is nothing so important connected with the Panama Canal, or nothing more important in the Panama Canal, next to the digging of the canal itself, than the giving to the public of information from time

to time, and continuously, of what the Government is doing and how it is doing it.

Mr. KENNEDY. I agree with you.

The CHAIRMAN. And it was in view of that criticism that I particularly wanted to call attention to the fact that the Reclamation Service, as I understand, through the newspapers and magazines of the country, is keeping the public thoroughly informed.

Mr. NEWELL. Yes, sir.

The CHAIRMAN. As the public desire that information on the progress and development of the work.

Mr. KENNEDY. I agree with the chairman as to that policy, and I wanted to ask Mr. Newell this: In that work, who has charge of the publicity department of the reclamation work?

Mr. NEWELL. The man who is charged with the duty of getting out this and seeing the newspaper men is C. J. Blanchard.

Mr. KENNEDY. Does he perform any other service?

Mr. NEWELL. Yes, sir. He sits in the outer office, and a great part of his time is spent in interviews with people who ask to see the chief engineer, and who should be given information at once and treated with courtesy, and whom it is absolutely impossible for the chief engineer to see if he is to do anything else.

Mr. KENNEDY. What salary does he receive for the service he performs to the Reclamation Bureau?

Mr. NEWELL. He receives \$2,000 a year. He is a man of great ability, who has served as statistician in the Census Bureau and prepared the bulletins on irrigation of the Census Bureau.

The CHAIRMAN. He is a general utility man, and is of great value in the service, in my opinion.

Mr. NEWELL. Yes, sir.

Mr. MARSHALL. At one time there were charges made that this publicity bureau was more or less political in its character.

Mr. NEWELL. Yes, sir; I have never heard those charges directly.

Mr. MARSHALL. You do not believe, Mr. Chairman, that it ought to be political, but that it ought to be without bias and uncolored?

The CHAIRMAN. Yes; and I will say that recently I have noticed that a certain journal which in the past had somewhat criticised this publicity is itself using now the information that is given out to the press, to this as to all other journals that desire it, alike, the facts with regard to the Government work; and inasmuch as there has been a little criticism of the fact that the Service was prepared to furnish proper information with regard to the progress of the work, I desire to go into it somewhat, because personally I heartily approve that part of the Reclamation Service work, and I think it would be a very great mistake to in any way curtail it. Of course we all understand that that work must not be, and is not, political, personal, or colored, simply giving the facts as to what the Government is doing; which is what the public ought to have, in my opinion.

Mr. MARSHALL. And on which there would be criticism if they did not give it?

The CHAIRMAN. Yes.

Mr. KENNEDY. I believe, speaking for myself personally, that the public ought to be fully informed on every great work undertaken for the public benefit and with public funds.

Mr. NEWELL. I may add that within the last decade there has been

a great evolution. Formerly the only reliable publication was an annual report. Then a great step was made in advance by splitting an annual report up into little pamphlets, which can be handled, and which people will read. Then we had the weekly news letter, printed on one side of a sheet of paper, which was authorized to be sent out; and now we have gotten down to the daily news letter, written on the typewriter and hung up, which is accessible through the daily press to millions where heretofore this report would go only to hundreds, and by many of them would be thrown into the waste basket.

(At 12.35 o'clock p. m. the committee adjourned until to-morrow, Friday, April 20, 1906, at 10.30 o'clock a. m.)

COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Friday, April 20, 1906.

The committee met at 10.30 o'clock a. m.

Present: Representatives Mondell (chairman), Reeder, Kennedy, Smith, and Cooper.

STATEMENT OF F. H. NEWELL, ESQ.—Continued.

Mr. NEWELL. Mr. Chairman and gentlemen, the question was raised yesterday in regard to the form of publicity. As I came down I took from the hook at the office door the material which we issue to the press. There are samples of them [exhibiting papers to committee], which show the general style of communication. These are taken from the hook by the newspaper men as they come in. They enable a very wide advertisement of proposed contracts and save the Government in the aggregate thousands of dollars which might otherwise be expended in advertising, because these facts are stated in a very brief way in the press, and thus reach practically all readers. The announcements are prepared colorlessly and without adjectives, as a rule, and keep the people of the country in touch with the work as it progresses.

In order to keep our men informed of changes and movements, we issue, on Monday morning of each week, a sheet giving the location of the principal men and the changes in personnel, and particularly the date of meeting of boards of consulting and supervising engineers convened to open bids.

The CHAIRMAN. Mr. Newell, as a sample of your daily bulletins, I think it might be well to insert in the record this bulletin of April 16 at this point. Of course the character of those bulletins varies greatly from day to day, necessarily?

Mr. NEWELL. Oh, yes. Some are very short; some are rather lengthy.

The CHAIRMAN. I think it might also be well, as indicating the character of this bulletin showing the location of engineers, to have the bulletin you have handed us also inserted at this point.

Mr. NEWELL. In short, the attempt is made within reason to give every possible publicity to what is being done, and how it is being done, and by whom it is being done, the prices paid, etc. Every time bids are opened they are published immediately, not only in the technical journals, but in a small sheet which is sent to all people who are interested.

Mr. REEDER. Even whether you reject the bids or not, the amount is published?

Mr. NEWELL. The amount is published.

The CHAIRMAN. Your annual reports contain all of the bids on contracts up to this time?

Mr. NEWELL. Yes; all the bids, and the action that was taken of them.

(The two papers above referred to, which the committee directed to be made part of the record, are as follows:)

APRIL 16, 1906.

The Secretary of the Interior has finally withdrawn from any form of disposition whatever under the public land laws the following-described lands in the State of South Dakota for use in connection with the reservoir, Belle Fourche project: N. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 4, T. 9 N., and SW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 33, T. 10 N., R. 3 E., SE. $\frac{1}{4}$ NE. $\frac{1}{4}$, NE. $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 22, S. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 23, T. 9 N., R. 3 E.

The Commissioner of the General Land Office has been directed to notify all persons who have made entry of such lands prior to the preliminary withdrawal, and who have not required a vested right thereto, that said lands have been appropriated for irrigation purposes, and that their entries will be canceled and their improvements paid for by the Government, as provided by law, unless sufficient cause is shown within sixty days from date of notice why such action should not be taken.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
RECLAMATION SERVICE,
Washington, D. C., April 16, 1906.

Programme for supervising and consulting engineers and experts.

EXECUTIVE.

Hon. E. A. Hitchcock, Secretary of the Interior. (Approves all matters and signs all contracts.)

Charles D. Walcott, Director of the Geological Survey and of the Reclamation Service. (Initiates action and reports to the Secretary.) At Washington, D. C.

C. E. Grunsky, consulting engineer in the Reclamation Service. At Washington, D. C.

SUPERVISING ENGINEERS.

Newell, F. H., chief engineer, office at Washington, D. C.

Davis, Arthur P., assistant chief engineer, office at Washington, D. C.

Quinton, J. H., supervising engineer for Colorado and Utah and consulting engineer for Nevada, office at Montrose, Colo. On leave April 12 to May 16.

Lippincott, J. B., supervising engineer for California, including Yuma and Klamath projects, office at 1108 Union Trust Building, Los Angeles, Cal. At Los Angeles, Cal., April 13-17; Hazen, Nev., April 19-24; then Los Angeles.

Savage, H. N., supervising engineer for Montana, North Dakota, and northern Wyoming, office at Billings, Mont. At Washington, D. C., April 16; Billings, Mont., April 20; then Great Falls and Browning, Mont.

Henny, D. C., supervising engineer for Oregon and Washington, office at 351 Washington street, Portland, Oreg.

Hall, B. M., supervising engineer for New Mexico, Texas, and Oklahoma, office at Carlsbad, N. Mex., P. O. Box 204.

Bien, Morris, supervising engineer in charge of land and legal matters, office at Washington, D. C.

Wells, Charles E., supervising engineer for Nebraska, southern Wyoming, and South Dakota, office Casper, Wyo.

Hill, L. C., supervising engineer for Arizona, office at Roosevelt, Ariz.

Taylor, L. H., supervising engineer for Nevada, office at Hazen, Nev. At Salt Lake City, Utah, May 2.

Ross, D. W., supervising engineer for Idaho, office at Boise, Idaho.

CONSULTING ENGINEERS.

Wisner, G. Y., consulting engineer for Arizona, California, and Wyoming, office at 34 West Congress street, Detroit, Mich. At Los Angeles until April 18; then Detroit, Mich.

Sanders, W. H., consulting engineer for Colorado, Nebraska, New Mexico, Oklahoma, and Arizona, office at 915 Grand View street, Los Angeles, Cal. At Hazen, Nev., April 19; then Montrose, Colo.; Salt Lake City, Utah, May 2; then Montrose, Colo.

Wiley, A. J., consulting engineer for Idaho, Oregon, Washington, Montana, and Wyoming, office at Boise, Idaho. At Billings, Mont., May 1-10.

Ensign, O. H., consulting engineer on electrical and mechanical matters; electrical expert for Pacific coast, office 321 Merchants' Trust Building, Los Angeles, Cal. At Chicago, May 28.

Fitch, C. H., executive officer and chief auditor and consulting engineer for South Dakota, office at Washington, D. C. At Wyncote, Wyo., April 21; Denver, Colo., April 27; Roswell, N. Mex., April 29; Carlsbad, N. Mex., May 2.

Code, W. H., chief engineer, Indian irrigation. Available for consultation on Indian matters, Hollywood, Cal., until further notice.

EXPERTS AND SPECIALISTS.

Storrs, H. A., electrical and mechanical expert. At Williston, N. Dak.

Chandler, A. E., engineer in charge of field work in land and legal matters. At Berkeley, Cal., until April 18; then Denver, Colo.

Darton, N. H., geologist in charge western section division of hydrology, office Washington, D. C.

Menas, Thos. H., engineer of soils, office at Berkeley Cal. At Fallon, Nev., until further notice.

Slichter, Chas. S., engineer in charge of investigation of movements of underground waters, office at 636 Francis street, Madison, Wis. At Chicago, Ill., May 28.

Perkins, E. T., engineer and traveling auditor, office 1108 Union Trust Building, Los Angeles, Cal. At Belle Fourche, S. Dak., April 15-21; Casper, Wyo., April 22-28; then Walcott and Denver.

Cass, F. H., transportation agent, office at 876 and 877 Federal building, Chicago, Ill.

Blanchard, C. J., statistician, office Washington, D. C.

Hammond, Geo. A., superintendent of drilling, office at Salt Lake City, Utah, P. O. Box 1608.

Leighton, Marshall O., engineer in charge hydroeconomic investigations, office Washington, D. C.

Grover, N. C., assistant hydrographer, office Washington, D. C.

Murphy, E. C., inspector in charge of river stations. At Phoenix, Ariz., April 14-28.

Webster, N. E., accountant, office at Washington, D. C.

Each engineer or expert named herein will notify by letter the office of the chief engineer of his proposed movements for the coming month. These letters are to be sent so as to reach the Washington office on Monday mornings. At the head of each letter indicate the subject as, "Proposed programme."

Important recommendations concerning any project should have the formal indorsement of both the engineer in charge and the consulting engineers.

If a change is necessary subsequent to the mailing of such proposed programme, a telegram should be sent on Saturday or Sunday at night rates. No important change should be made without such notice to the chief engineer.

BOARD MEETINGS.

Subject to change by the chief or assistant chief engineer to conform to requirements of work.

The exigencies of the service frequently require sudden changes in the itinerary of consulting engineers. It is therefore very important that the Washington office be kept informed by wire of the whereabouts of all persons, so that they may be reached by wire on short notice. Address all telegrams, "Hydrographer, Geological Survey, Washington, D. C."

Boise, Idaho, April 16: To open bids for main canal, Payette-Boise project. Wiley and Ross.

Hazen, Nev., April 19: To open bids for laterals and structures, Truckee-Carson project. Lippincott and Taylor.

Salt Lake City, Utah, May 2: To open bids for telephone system, Strawberry Valley project. Sanders, Taylor, and Swendsen.

Billings, Mont., May 10: To open bids for dam, Lower Yellowstone project. Savage, Wiley, and Weymouth.

Belle Fourche, S. Dak., May 15: To open bids for five highway bridges, Belle Fourche project.

Billings, Mont., May 24: To open bids for Garland Canal, Shoshone project. Savage, Wiley, Ahern.

Chicago, Ill., May 28: To open bids for electric power plant, Garden City project, Kansas. Slichter, Ensign, Gordon.

Belle Fourche, S. Dak., May 29: To open bids for completion of main supply canal, Belle Fourche project.

Portland, Oreg., June 11: To open bids for construction of storage works near Conconnully, Wash., Okanogan project.

Portland, Oreg., June 11: To open bids for Cold Springs dam, Umatilla project, Oregon.

Salt Lake City, Utah, June 14: To open bids for construction of Strawberry tunnel, Strawberry Valley project.

ADVERTISEMENTS FOR BIDS.

April 16: Boise, Idaho, main canal, Payette-Boise project.

April 19: Hazen, Nev., laterals and structures, Truckee-Carson project.

May 2: Salt Lake City, Utah, telephone system, Strawberry Valley project.

May 10: Billings, Mont., Lower Yellowstone dam, Lower Yellowstone project.

May 15: Belle Fourche, S. Dak., highway bridges for Belle Fourche project.

May 24: Billings, Mont., Garland Canal, Shoshone project.

May 28: Chicago, Ill., electric power plant, Garden City project, Kansas.

May 29: Belle Fourche, S. Dak., main supply canal, Belle Fourche project.

June 11: Portland, Oreg., storage works, near Conconnully, Wash., Okanogan project.

June 11: Portland, Oreg., Cold Springs dam, Umatilla project, Oregon.

June 14: Salt Lake City, Utah, tunnel, Strawberry Valley project.

APPOINTMENTS, ASSIGNMENTS, TRANSFERS, ETC.

Bliss, George H., assistant engineer, left Washington April 7, en route to Glendive, Mont., for duty on Lower Yellowstone project.

French, James A., engineer; recently completed reconnaissance surveys in Montana; has been assigned to Shoshone project, Wyoming, in connection with work on outlet tunnel and concrete lining construction.

Hosford, C. K., assistant engineer; was employed with F. E. Weymouth on Lower Yellowstone project. Resigned, effective March 9.

Lillis, B. C., assistant engineer; was employed during field season of 1905-6 on reconnaissance surveys in Montana under H. N. Savage. Furloughed from March 16, 1906.

McGehean, Paul, assistant engineer; was employed with Homer Hamlin in work on Yuma project. Furloughed from March 9, 1906.

Stratton, G. E., assistant engineer; will complete present assignment on Lake Basin project reconnaissance about April 15, and will be transferred to North Dakota for duty in connection with Nesson pumping project.

Vernier, E. W., engineering aid; was employed with C. E. Wells in work on Pathfinder dam, Wyoming. Resigned, effective March 22, 1906.

Pease, Harold, T., engineering aid; recently appointed; has been assigned to duty with H. A. Storrs, Williston, N. Dak. Left Chicago about April 5.

Mr. NEWELL. To resume the question of publicity, I would like to call attention to one more matter—that in all purchases of all kinds whatsoever the greatest possible publicity is sought, as is required by law, in the way of advertising for proposals, even for the most simple matters. To buy a lead pencil requires, under the law; as much care as to buy a \$10,000 steam shovel. These are some of the blanks that are used in connection with purchases [exhibiting papers to committee].

The CHAIRMAN. What proportion of your printing do you imagine is done by the Government Printing Office?

Mr. NEWELL. We are gradually taking from the Government Printing Office as much of the work as possible, under a decision of the Comptroller that the Reclamation Service is not a part of the Executive Departments—not a part of the Department of the Interior, but under the Department of the Interior. Under that construction of law, it is possible to have the printing done anywhere, in the discretion of the Secretary.

The CHAIRMAN. Have you had a considerable amount of printing done outside?

Mr. NEWELL. It is relatively small at present. It is mostly the specifications, in order to get them out quickly.

The CHAIRMAN. Where you advertise for printing, does the Public Printer submit a bid?

Mr. NEWELL. No. We take the advertisement around to three or four or more prominent firms in the city and get bids; and in the course of an hour or two we can have the whole matter adjusted—the bids received, the contract awarded, the work well under way, and almost endless official routine saved.

Mr. KENNEDY. I call your attention in that connection, Mr. Newell, to the fact that this bill giving a status to the Reclamation Service, if it becomes a law, may possibly change the rule even on that matter of printing.

Mr. NEWELL. Still I think that bill was considered with that in view—that the bill does not make it a part of the Departments, but simply under them, in the same way the post service is not a part of the Post-Office Department, but is under it.

In looking at these blanks you will notice toward the last a number which sum up the cost. As far as possible, all costs are brought down to a few figures and shown diagrammatically to exhibit the progress of the work and what the different units are costing the Government. Very few Government organizations have taken the trouble to know exactly what the units of cost are—such, for example, as units of cost for moving a yard of earth or laying a yard of concrete. But we believe it to be essential as a guidance to future work to know what it has cost in the past—not what we paid for it, but what it has cost. To that end we keep careful records, not only of what the work has cost the Government, but what it has cost the contractor. Our agreements with the contractor contain a clause by which he submits to us his bills of expense; what he has paid for his material;

what he has paid for his freight, etc.; we keep a daily record of his laborers and his teams, and sometimes know more than the contractor as to just what the work is costing him, and are able to predict even before the contractor does whether he is making money or whether he will probably go to the wall. It is very necessary to know whether a contractor is making money or not, so that you can hold him to the performance of his contract. Of course, if a contractor is losing, and we know that he is doing everything in his power, it is desirable in every respect within the limit of the law to ease up on him as much as possible, and not force him into bankruptcy, which involves trouble for everyone concerned.

The CHAIRMAN. You keep a very close force account on all your contractors?

Mr. NEWELL. Very close. We receive his railroad expense bills, and then go to the railroads for the agreed refund of 50 per cent.

The CHAIRMAN. The Attorney-General has held that the Government, in its dealings with the railroad, is not bound by the antirebate law.

Mr. COOPER. That looks ridiculous to me—that the Government itself demands a 50 per cent rebate, and at the same time prosecutes everybody else for the same thing.

Mr. NEWELL. The law provides that the Government may have free transportation or other concessions from the railroads. This work is not being built for profit. It is not in competition with anyone; and if the Government can obtain anything in the way of a refund, it seems to me to be our duty to get it.

The CHAIRMAN. I think that is entirely consistent and proper and reasonable. While it is unlawful, illegal—and should be—for one individual to benefit at the expense of another, as must be the case where one individual secures rebates or rates more advantageous than another, when all the people, represented by their Government, obtain a concession then all the people are benefited.

Mr. COOPER. Yes; but you must remember that the other people who ship over that line have to pay for the loss on the shipment to the Government.

The CHAIRMAN. They do not sustain a loss.

Mr. COOPER. Then they are charging too high rates.

Mr. NEWELL. There is a point there that I would like to make, viz, that the railroads themselves are benefited by millions of dollars by this investment. Whether we desire it or not, they are the first beneficiaries. They obtain hundreds of thousands of dollars a year in freight from the Government. They get millions of dollars increase in the value of their property. If this were a commercial enterprise and the law permitted it, they would gladly haul that freight for nothing in order to develop their own country and develop their own traffic. So that they are not doing a very philanthropic act, but would be doing one of ordinary commercial justice, in our opinion, if they should haul it for nothing. There are certain lines on which by law we have free haul; on others we have 50 per cent haul.

Mr. KENNEDY. Mr. Newell, does that rebate in any way touch materials shipped by contractors?

Mr. NEWELL. Yes.

The CHAIRMAN. It does not go to the contractors, however.

Mr. KENNEDY. No; but you have a clause in your contract with the contractor that if you get a reduction or rebate on material shipped you get the benefit of that?

Mr. NEWELL. Yes. He pays the railroad company a thousand dollars for hauling certain equipment; he turns over his bills of expense; we go to the railroad and render a claim for \$500, and that is credited to the reclamation fund.

Mr. KENNEDY. Is it not true that there is some provision, with reference to certain subsidized railroads, that they have to carry certain Government supplies at less than the usual cost? Take, for instance, the Quartermaster's Department of the Army; has not that department certain privileges over certain roads?

Mr. NEWELL. We enjoy the privileges of free haul over certain lines and 50 per cent haul over others under the general law; but that 50 per cent of regular tariff rates is sometimes higher than could be had on a commodity rate.

Mr. COOPER. Then, in order to get the benefit of the 50 per cent rate the Government would have to agree to deliver this material on the ground or at least at a station somewhere, would it not?

Mr. NEWELL. No; the contractor pays for his freight delivered at the station. We have nothing to do with it; but he sends the railroad bill to us which he has already paid.

Mr. COOPER. What right do you have under the general law to claim a 50 per cent rebate if the Government is not the real shipper?

Mr. NEWELL. The Government gets the benefit of it. The interstate-commerce act authorizes it.

Mr. KENNEDY. No; here is the theory: The Government is the real party in interest doing this work, and pays out the money which enters into the material and the labor. Now, the cost of shipping material is a large item, and if in the contract with the contractor they reserve the right to get the benefit of whatever rebate should be obtained, the ultimate benefit goes to the Government, and it does not work to the disadvantage of the contractor.

Mr. COOPER. That might be under a strained construction of the law; but that is what it would amount to.

The CHAIRMAN. Mr. Newell, you credit these freight rebates to the particular project for which the rebate is obtained, do you?

Mr. NEWELL. Yes; it goes to reduce the cost to the man on the ground. In other words, in every possible way that commercial and other law will permit us to cut expenses we are endeavoring to do it. We do not want the fact held up in any way that we have spent a dollar which could be saved under any existing law.

The CHAIRMAN. I have not noticed any reference to the amount of those rebates in any of your reports. You have not entered them in your statements as receipts to the fund, have you?

Mr. NEWELL. We are endeavoring to obtain from the Treasury now a full statement of refunds. The system of getting these facts from the Treasury is very slow in growth. Sometimes it requires several months to get the credit on the books in the proper form; but we ultimately hunt them up and see that they are there.

The CHAIRMAN. The companies pay rebates in the form of checks and drafts and the Treasury credits these to your fund?

Mr. NEWELL. Yes. The drafts are to the order of the Secretary of the Interior, who deposits them in the Treasury.

The CHAIRMAN. As a matter of fact, it may be months after the statement is made before the Treasury finally completes its book making and you get the completed record of the transaction?

Mr. NEWELL. It occasionally happens that a credit of this kind goes into miscellaneous receipts, and requires personal examination to find whether the particular item has gone to the reclamation fund. The whole procedure is still novel.

The CHAIRMAN. I should imagine that it would be well to have those items ultimately kept separate in your bookkeeping, so that if the question ever arises you will know just what you have received.

Mr. NEWELL. Oh, yes; we do, ultimately. On the bookkeeper's book in our office you will find a full history of every claim and the date when it was finally credited to the reclamation fund.

The CHAIRMAN. I imagine that that is one of the items of receipts that it would be well to enter in the annual reports.

Mr. KENNEDY. Yes; I think so.

The CHAIRMAN. Mr. Newell, there are certain questions of a general character that I would like to take up with you, and it is a question in my mind whether it would be well to take them up now or after you have gone over the different projects. One is the question of force-account work versus contracts; then the question as to how your contractors in the main have been getting along with their work, and as to whether or no there has been a general gradual increase in unit prices. There are several questions of that kind.

We will either take them up now or as we come to the projects, as you think best. I suppose that in a discussion of the various projects those questions will come up anyway.

Mr. NEWELL. They will be involved anyway, and possibly, to give a general review of the whole matter, it might be a little more to the point now to bring up the others as they develop.

Mr. KENNEDY. Mr. Chairman, I suggest that when Mr. Newell gets down to the separate divisions of the work we make a note ourselves of the questions we want to ask him on the particular project, and let him get through with his statement, and then ask our questions at the close before he leaves that project.

The CHAIRMAN. That might be well.

Mr. NEWELL. To illustrate at first the magnitude of the entire work I would like to give you a few figures. We have actually irrigated now 12,000 acres. We have under ditch 51,000 acres, and will probably have twice as much early in May.

The CHAIRMAN. Where are the 12,000 acres?

Mr. NEWELL. The 12,000 acres are in the Truckee-Carson project, where the water is actually being applied. We have built 101 bridges, of an aggregate length of 3,646 feet.

Mr. REEDER. What are these bridges; are they bridges across the ditches?

Mr. NEWELL. Yes; they are bridges across the canals. We have built 135 miles of first-class canals—that is, canals of 300 cubic feet per second capacity or more.

The CHAIRMAN. Another question right there in regard to bridges:

You are required to and you do, I assume, bridge your canals at all crossings?

Mr. NEWELL. On all main highways and county roads at intervals of 1 or 2 miles, sufficient to afford an accommodation to the public and yet not cross the canal any more than absolutely necessary.

We have built 135 miles of first-class canals, 80 miles second-class, and 272 third-class canals. We have bought 123,000 barrels of cement and made 32,000 barrels. We have excavated nearly 12,000,000 cubic yards of earth, which is comparable with some of the work on the Panama Canal. We have excavated a million and a half cubic yards of loose rock and 600,000 cubic yards of solid rock. We have laid 116,000 cubic yards of concrete and 78,000 square yards of riprap. We have purchased 10,000 tons of coal and about 20,000 cords of wood, about 10,000 tons of steel, purchased over 5,000,000 feet of lumber board measure, and sawed nearly 3,000,000—that is, in certain localities we put in our own sawmills, because that is the only available way of getting lumber in remote places. We have manufactured a great many brick and a great many barrels of lime, incidentally.

Mr. COOPER. Where you have sawmills you are cutting Government timber?

Mr. NEWELL. Government timber; yes. For the lagging and temporary false work it is necessary to have large quantities of cheap lumber. We put our sawmills in the mountains, cut the lumber under customary permits, and haul it out. Otherwise the cost of false work would be enormous.

The CHAIRMAN. Ordinarily, under your contract, do you furnish lagging and false work?

Mr. NEWELL. It depends on the locality.

The CHAIRMAN. You speak of using the Government timber for lagging.

Mr. NEWELL. Where the work is remote, we do. We agree to furnish the cement, and sometimes the timber, to the contractor. We have purchased 40,000 linear feet of piles, and have erected 63 structures, each costing over \$500, and 22 smaller structures. We have run 10,000 square miles of topography and mapped the country accurately. We have run 8,000 miles of transit lines and 15,000 miles of level lines. We have erected 350 miles of telephone and built already 31 tunnels, of an aggregate length of 25,000 feet—nearly 5 miles.

Of animals, we own a horse herd of about 500 animals. Of office buildings we have 15 first-class buildings, each costing \$1,000 and upward; also 11 second-class buildings, costing less than \$1,000 each. Those buildings, I may state, are generally built fairly substantially, with the idea that when we are through with them we can sell the building and credit the amount to the reclamation fund. It is cheaper to build a good structure and then sell it than to erect these very flimsy structures, which cost nearly as much and are not good for anything in the course of a few years.

Of the bunk houses—that is, the temporary houses—we have 18 of the first class, 74 second class, and 86 third class. Those bunk houses are pulled down and moved frequently, at short intervals. Of tents we have over 500; 57 heavy wagons, 55 light wagons, and 146 Fresno

scrapers. Of rolling stock for transportation we have 4 locomotives, 172 cars, and 36,000 feet of rail. That is for construction purposes.

The CHAIRMAN. Where is that machinery?

Mr. NEWELL. The locomotives are in Colorado, in the Gunnison tunnel there.

The CHAIRMAN. The Gunnison tunnel?

Mr. NEWELL. Yes. It will be necessary to add a few more. Of electric machinery and air compressors we have quite a large equipment, and the aggregate estimated value of the tools and machinery on hand is about a quarter of a million dollars.

Of men, we were working under force account last month 1,811, with aggregate wages of \$90,000. We have fed 1,000 horses—that is, including our own and those that were hired under small contracts.

In freighting we carried a little over 2,000 tons, at a cost of 23 cents per ton per mile. The average cost frequently runs about 25 cents per ton per mile for hauling on heavy roads.

The value of the supplies on hand is about \$70,000; the value of the cement in stock is \$15,000; the amount paid for lands is \$150,000. Those are mostly lands to be flooded in the reservoir.

As to the contractors' equipment: The contractors now have an aggregate of a little over 4,000 men at work, and last month—March, 1906—they worked over 50,000 men-days. They have 23 second-class office buildings and 39 third class, and about 200 bunk houses. The contractors are using 322 heavy wagons, 586 wheel scrapers, 794 Fresno scrapers, 5 locomotives, 93 stationary engines, and so on.

I give you these figures simply to illustrate the fact that our present equipment is very large, both that in the contractors' hands and that in the hands of the Government. These figures answer some of the questions which the chairman asked in regard to force account.

In all cases we endeavor first to let a contract, and usually do succeed in letting a contract at a reasonable rate. But the advance in the price of material, the shortage of the labor market, and the enforcement of the eight-hour law has put several contractors into bankruptcy; and, according to our agreements in the contracts made with them, the moment they are forced into bankruptcy it is necessary for us to take their tools, machinery, equipment, and stores and proceed at once with the work. There is usually not a delay of five minutes in proceeding.

The CHAIRMAN. Mr. Newell, what contractors up to this time have failed (if you have them in mind), so that you have had to take the work over?

Mr. NEWELL. The principal contractor that failed was the Taylor-Moore Construction Company. That company failed on the Gunnison tunnel and on the Hondo.

The CHAIRMAN. The Gunnison tunnel in Colorado?

Mr. NEWELL. In Colorado.

The CHAIRMAN. And the Hondo?

Mr. NEWELL. And the Hondo reservoir in New Mexico. The Widell-Finley Company, having a contract on the Belle Fourche, in South Dakota, and two contracts in Montana, also failed, or has gone into the hands of a receiver.

The CHAIRMAN. Whereabouts in Montana?

Mr. NEWELL. On the lower Yellowstone, as described by Mr. Sav-

age. There are other small contractors, whose names slip my mind, that have also failed.

The CHAIRMAN. Those are the principal contractors?

Mr. NEWELL. Yes; those are the principal contractors. In a few cases we have not been able to get any satisfactory bids, and the bids have been rejected and authority given by the Secretary of the Interior for prosecuting the work under force account to a point at least where we will develop what it probably will cost, or until the labor conditions adjust themselves.

The CHAIRMAN. In the case of the Taylor-Moore Company, on the Gunnison tunnel, how large was their bond or obligation to the Government that was collectible?

Mr. NEWELL. I think there was a bond of \$155,000 and an equipment which cost them probably about \$50,000. They were unfortunate in not having sufficient capital to carry on the work, and they purchased their machinery largely from the bondsmen, or rather, the sellers of this machinery furnished a part of the bond. That restricted their choice of machinery and of methods. If they had been able to control larger capital they might have succeeded in making larger earnings at the outset and saved themselves from immediate bankruptcy.

The CHAIRMAN. Have they resisted your taking over their machinery?

Mr. NEWELL. Not at all.

The CHAIRMAN. You have not, so far, levied on their bond, as I understand it?

Mr. NEWELL. No; it can not be done, as I understand it, until the work is completed. The bond is to be collected if the work when completed costs more than the bid. In other words, we keep a careful account, on behalf of the contractors, of what the work has actually cost, and charge against them and the bond any excess over the original bid. When the work was taken over, on May 27, 1905, we immediately put it in as good shape as possible, continued the construction, and advertised for another bidder. The bids, however, in the judgment of the board of engineers, ran too high, and they were all rejected, on the advice of the engineers, by the Secretary of the Interior.

The CHAIRMAN. Do you recall how much above the contract of the Taylor-Moore Company in the first instance the subsequent bids were?

Mr. NEWELL. The lowest was about a half million dollars above, dependent, however, on the assumption made on the earning power as regards the time limit. They had a certain increase of earnings if they finished the work within a certain time, and a certain diminution if it was protracted beyond a certain time, so you must estimate as to when they would have finished, as to the bonus or forfeit. If the Taylor-Moore Company had pushed their work forward and had earned all the bonus which they anticipated, the new bids would run, I think, about half a million dollars above the Taylor-Moore figures.

The work is being carried on very energetically under a very competent tunnel man, Mr. J. H. Quinton, who has built in the aggregate over seventy tunnels, and under Mr. I. W. McConnell, engineer on the ground. At present we are making a world record on rapid

and economical tunnel construction. Whether we shall maintain that or not depends largely on the future developments as the work progresses.

The CHAIRMAN. As to the cost of that construction, you can not determine that fully until you complete it?

Mr. NEWELL. No. The cost of lining the tunnel has not yet been determined by actual work. We have not put in any permanent lining, but it is hoped that we will come within the figures of the Taylor-Moore Company unless we have bad luck or encounter too much soft ground. We are running now from four headings. Heading No. 1, at the Gunnison River, is in 2,714 feet of solid granite. We are encountering a great deal of water—about 400,000 gallons per day.

At the lower portal we are in about 1,200 feet also. Headings Nos. 2 and 3 are from a shaft which is located about a mile from the lower portal. There we are working each way from the shaft. Heading No. 2, going toward the river, is in a solid black shale, which cuts very readily, and is in 3,278 feet. Heading No. 3, starting toward the lower portal, was in solid shale, and the roof has gradually gone into gravel and clays, making it very dangerous and necessitating relatively slow progress. This heading is in 1,339 feet.

Heading No. 4 (2,634 feet) was started in the soft adobe, clays, and gravels, and was very badly handled by the Taylor-Moore Company; and it took many weeks to get the work in good shape so that rapid progress could be made. No. 4, when the Congressional party visited it, was wholly in mud and soft sands. Now the bottom is in the black shale, but the roof is still of soft, treacherous material, and great care must be taken to prevent it running.

The CHAIRMAN. Of course, there must be taken in consideration, in connection with the matter of force account work, the fact that you must of necessity accumulate a vast deal of machinery.

Mr. NEWELL. Yes.

The CHAIRMAN. Which wears out very rapidly; and that unless you are going to continue to do tunnel work by force account you will have on your hands at the close of a job of this kind a very great deal of expensive material. Now, do you know how much the machinery amounts to that you have purchased for the Gunnison tunnel?

Mr. NEWELL. We have purchased very little, because we took over the Taylor-Moore outfit; but from time to time we have improved it and put in new machinery. I can not give the amount offhand, but it is all carefully recorded on the books; and that is a part of the account which is being kept with the company. At the expiration of the contract all that machinery must of necessity be valued, and presumably will be sold to the best possible advantage as a credit to the work. If it is not sold it will be credited at the rate it would otherwise have been sold for.

The CHAIRMAN. That class of material, however, ordinarily does not bring a very high price?

Mr. NEWELL. It will be practically worn out in service. Very little of it is worth more than junk when the work is finished.

The CHAIRMAN. I know that ordinarily people who do a very great deal of construction work, like railroads, feel that they secure very much better results in the long run by contracting than by attempting

to do the work themselves. I have assumed, therefore, that where great organizations, as well and thoroughly organized and equipped as the railroads and other great enterprises are, believe that they can secure the best and the most economical results by leaving the work exclusively in the hands of men whose business it is to build and construct, that is pretty good proof that long experience has proven that that is the safer and the cheaper method.

Mr. NEWELL. That is true. In the case of railroads, however, their business is to execute railroad business. On the other hand, the sole and only business of the Reclamation Service is to build these works; and while I believe thoroughly in contract work and try to let everything by contract, I know that we are getting better prices and better treatment by having the ability, in case of exigencies, to step in and do the work ourselves.

Another point that should be made is this: The railroads are not, as a rule, pursuing the same plan in contracting for work that the Government does. The large railroad builders, as I understand it from talking with the chief engineers, do not advertise to Tom, Dick, and Harry that they have a piece of work to be done. Their work is of a specialized kind. Everything is standardized. Every piece of work has been done over and over again, fifty or a hundred times, and they know every man who is competent to do it. So that the railroad officials call in a few contractors in whom they have faith, and either award them a contract or make an arrangement with them on the basis of cost plus a percentage, which is not permitted by existing law in Government work.

The CHAIRMAN. That plan, if it is being practiced now to any considerable extent, must be rather recent policy. It has not been the policy of the railroads in the past, I think, to do anything but make a straight contract.

Mr. NEWELL. Yes; it is a modern development. On the other hand, if a railroad is going to build an unusual piece of work, something that has not been built before, not like a straight line of track or ordinary bridges, but something that can not well be described in advance, its engineers get right in and build it, because the company knows that it can be done in that way quicker and at less expense than if it attempted to describe it, and let a contract involving great uncertainties.

The CHAIRMAN. Now, Mr. Newell, is it not a fact (if you have examined that question) that in the main you have been letting your work, at least your first work, rather lower than the same class of work was being done by the large corporations?

Mr. NEWELL. It is hard to make comparisons, because no such work has been done by corporations under such circumstances, remote from centers of population. The prices bid were low; and since that time there has been a very rapid increase in wages and in materials.

The CHAIRMAN. It is true, however, that the bids were generally quite low?

Mr. NEWELL. They were reasonable bids. Under ordinary circumstances, if the people had had sufficient capital, they would have made money on them. But the people that failed, did so more from lack of capital and lack of experience than on account of the prices.

The CHAIRMAN. Is it not true that in all of your first contracts

whether that is exactly true or not would be indicated by the character of your bids? Is it not true that on practically all the first contracts where these failures were made the bids of the large contractors, who had had a great deal of experience with this kind of work, were generally considerably higher than those of the low bidders to whom the work was properly let?

Mr. NEWELL. Yes; there was a very wide range in bids, and most of the high bidders expressed the opinion that they did not want to get the contracts. They were willing to bid, but they did not expect to get the work.

The CHAIRMAN. They did not want to get it at the extremely low prices that were being bid by certain parties?

Mr. NEWELL. Yes; I want to go clearly on record as being heartily in favor of and believing in contract work, and we will do it wherever possible; but at the same time we must have the option and the ability to extricate ourselves from a difficult position. We are not doing any force account work (which really means small contract work) where we can avoid it. The so-called "force account work" is really a subdivision of the work into a great many small contracts, each of which is let after receiving competitive bids. The Department is urging us to do force account work that we may employ Indians on certain work, which I believe to be good policy in the Indian reservations; but where we do the force-account work it is generally on the line of a great many little contracts let to the people in the locality.

There is a question of public policy involved there also, whether it is not better to let the people who are on the ground get the benefit of the work than to bring in a big contracting firm, we will say, from Chicago, who will buy all their supplies in Chicago and who do not deal with the local dealers. We have been urged very frequently, and with a good show of reason, where we can not let a piece of work at a reasonable price to a big contractor, to subdivide it into a great many little contracts and let the local people and the local shopkeepers get the benefit of the work and keep the money in the country.

The CHAIRMAN. I should say that was a very excellent policy to follow, providing it was in the form of a contract. As a matter of fact, as to the class of work that the small contractor can do with the class of outfit that he would ordinarily have, I should say that you would often get a lower bid from a small outfit than you could get from a large one, because the expenses are not so great in proportion with the small outfit where the man handles it himself as they are with a larger one, where the superintendence is in the hands of a high-priced man.

Mr. NEWELL. There is another condition that I think we should not forget, viz, that this is not in the same category as the ordinary Government work. This work has to be paid for by the man working out in the field; and I think we have to apply an entirely different set of rules to it than you would to ordinary Government work, such as building a fortification or a public building, which is paid for by the entire people, and where the ownership is remote in the entire people. And while I thoroughly believe in the contract system, yet I do believe that there are certain other elements of commercial success which must be considered.

Mr. KENNEDY. Just a moment. If you are through with that gen-

eral head I would like to ask just a few questions. You spoke of the construction of bridges across the canals. What is the character of these bridges?

Mr. NEWELL. The bridges, as a rule, are wooden truss bridges. In some cases we put in steel trusses, and in a few others they are of concrete-steel construction. They must be maintained forever, and under the existing rules and customs the man who builds the canal must build and maintain the bridges. Ultimately they will probably be turned over to the counties for maintenance.

Mr. KENNEDY. How soon will that framework have to be replaced?

Mr. NEWELL. It should not be replaced for a quarter of a century.

Mr. KENNEDY. So that, speaking generally, the bridges you are now constructing over the canals are bridges which will stand for at least twenty-five years?

Mr. NEWELL. Yes.

Mr. KENNEDY. And those of concrete and steel construction, of course, will stand much longer?

Mr. NEWELL. Yes.

The CHAIRMAN. The majority of your small bridges, I suppose, are wooden structures?

Mr. NEWELL. Wooden truss bridges; yes; painted and protected from the weather, so that they will last for a great many years.

Mr. KENNEDY. Now, Mr. Newell, you spoke of having 350 miles of telephones. Are these to connect the various branches of the work?

Mr. NEWELL. Yes. The first thing is to build the telephone line along the line of the canal, so as to have communication with all parts of the work; and when the system is being operated, when it is being "wet up," the telephone is needed at all times to guard against breakage. If a canal breaks at a gopher hole, we must at once bring all the men and teams to save it.

Mr. KENNEDY. These telephones as constructed are not used for any private purpose at all?

Mr. NEWELL. No; they are used for the operation of the system.

Mr. KENNEDY. Are the lines upon Government land acquired for the uses of the work?

Mr. NEWELL. Yes; they are on the right of way of the canal.

The CHAIRMAN. Those telephone lines, in the main, or possibly altogether, will be necessary for the administration of the project after construction?

Mr. NEWELL. Yes.

Mr. KENNEDY. Are these lines permanent in character? What sort of poles, for instance, are used?

Mr. NEWELL. They are of the most permanent character we can build. The poles are the best quality of standard telephone poles, and are put up to last indefinitely. Many of the poles we are using are of iron, out in the desert where they are exposed to the sand storms.

Mr. KENNEDY. And where you use timber you get it from the Government land?

Mr. NEWELL. Wherever it is suitable; yes. As a rule, though, we must get the more lasting timbers from the coast.

Mr. KENNEDY. And you have built these telephone lines not solely with reference to temporary use, but for permanent use in connection with the reclamation service?

Mr. NEWELL. Yes.

Mr. KENNEDY. You spoke, also, of the Government having paid \$150,000 for land to be flooded. Can you state to the committee the average price per acre of that land?

Mr. NEWELL. It is probably not far from \$10. It runs all the way from a dollar and a quarter an acre up to \$100 an acre, in the case of highly improved, fertile farms in the bottom of a basin. There are in hand a large number of contracts for further land purchases involving upward of half a million dollars.

Mr. KENNEDY. Then, Mr. Newell, you have purchased and paid for up to this time probably about 15,000 acres of land, averaging about \$10 an acre?

Mr. NEWELL. Yes.

Mr. KENNEDY. To be flooded?

Mr. NEWELL. Yes. I can give you the exact figures, if you wish.

Mr. KENNEDY. I mean just in a general way. You spoke a little while ago about taking, under your contracts which were defaulted, the machinery of the contractors. I suppose that you reserve in each contract simply an option that you may do that?

Mr. NEWELL. No; it is mandatory that we must do it. The verbiage is given in each contract.

Mr. KENNEDY. I simply want to understand the theory; that is all.

Mr. NEWELL. The moment that the contractor's outfit is likely to be attached by his other creditors we step in, in the name of the Government, and take possession of it, inventory it, and take his men upon our pay rolls and tell them to go back to work until we can make some better adjustment of the work. But we step in the place of the contractor, become a trustee for him, and stave off all executions against the property.

Mr. KENNEDY. So your contract with the contractor requires you, in the event of his failure, to take over the materials on hand and the machinery and apparatus used by him? Do you not think that the same object would virtually be accomplished by having simply an option giving you the right to do that?

Mr. NEWELL. I think not, because we must cut off other creditors. We must be in a position so that there will be no question that the Government, as the principal party in interest, shall take everything and preserve it from attachment. The work would be seriously crippled and the part that is paid for lost if, for instance, a sheriff should levy on some machinery and undertake to take it away.

The CHAIRMAN. Might it not be possible that in case of the failure of the contractor to live up to his contract you might desire to get rid of him entirely and hold his bond, and let another contract, and not be obligated to take over his chips and whetstones and plunder?

Mr. KENNEDY. They could make that as part of the contract and turn it over to the fellow who took the contract, I presume, in the diminution of the price.

The CHAIRMAN. But he might not take it; he might have his own.

Mr. NEWELL. The language of the contract on that point is that the Secretary shall have the power to suspend the operation of the contract, and he may take possession of all machinery and plant.

Mr. KENNEDY. That is optional. I thought that was the fact. Calling your attention, Mr. Newell, to the contract and the language

in the contract covering that point, I would like to have you read it into the record.

Mr. NEWELL. Yes. Section 22 of the general specifications is as follows:

Should the contractor fail to begin the work within the time required, or fail to begin the delivery of material as provided in the contract, or fail to prosecute the work or delivery in such manner as to insure a full compliance with the contract within the time limit, or should any question arise as to whether or not the contractor is properly carrying out the provisions of his contract in their true intent and meaning, at any time during the progress of the work, notice thereof in writing shall be served upon him, and upon his neglect or refusal to provide means for a more energetic and satisfactory compliance with the contract within the time specified in such notice, then and in either case the Secretary of the Interior shall have the power to suspend the operation of the contract, and he may take possession of all machinery, tools, appliances, and animals employed on any of the works to be constructed under the contract, and of all materials belonging to the contractor delivered on the ground, and may use the same to complete the work, or he may employ other parties to carry the contract to completion, substitute other machinery or materials, purchase the material contracted for in such manner as he may deem proper, or hire such force and buy such machinery, tools, appliances, materials, and animals at the contractor's expense as may be necessary for the proper conduct of the work and for finishing it in the time agreed upon. Any excess of cost arising therefrom over and above the contract price will be charged against the contractor and his sureties, who shall be liable therefor. The failure to order improvement of methods or increase of force, plant, or efficiencies will not relieve the contractor from his obligation to perform good work or finish in the time agreed upon.

Mr. KENNEDY. Then, Mr. Newell, as a matter of fact, the right is simply reserved to take the machinery, and you are not under obligations to take it unless you see fit to do so?

Mr. COOPER. But you would feel that was an additional security you were getting from the defaulting contractor that could be entered up as a matter of credit, so as to help make you whole.

The CHAIRMAN. In view of the fact that the specifications under which contracts are let have been referred to, and will necessarily be referred to, during the hearings, it occurs to me that it might be well to insert in the hearings a copy of a pamphlet which I have here, containing advertisement proposal specifications for structures in district No. 3, Truckee-Carson project. This is known as "Specification No. 80," and I presume is in the usual form of specification used by the Department.

(The committee thereupon adjourned until Monday, April 23, 1906, at 10.30 o'clock a. m.)

SPECIFICATIONS No. 80.

Advertisement, proposal, and specifications—Lateral irrigation ditches with structures—District No. 3—Truckee-Carson project, Nevada.

ADVERTISEMENT.

DEPARTMENT OF THE INTERIOR,

Washington, D. C., March 9, 1906.

Proposals will be received at the office of the United States Reclamation Service at Hazen, Nev., until 10 o'clock a. m., April 19, 1906, for the construction of about 145 miles of irrigation ditches, involving about 600,000 cubic yards of excavation, with structures and bridges, in Carson Sink Valley, Nevada.

Particulars may be obtained from the chief engineer of the Reclamation Service, Washington, D. C., or the supervising engineer, Hazen, Nev.

E. A. HITCHCOCK, *Secretary.*

NOTICE TO BIDDERS.

Each bid must be accompanied by a certified check for \$10,000, payable to the order of the Secretary of the Interior, as a guaranty that the bidder will, if successful, promptly execute a satisfactory contract and furnish bond in the sum of 20 per cent of the contract price for the faithful performance of the work. It must also be accompanied by the guaranty of responsible sureties to furnish bond as required, if bid is accepted.

Proposals must be marked "Proposals for construction of laterals, Truckee-Carson project," and addressed to the United States Reclamation Service, Hazen, Nev. The address slip printed below may be used by the bidder, if desired.

*The United States Reclamation Service,
Nevada.*

Proposal for construction of laterals, Truckee-Carson project..

PROPOSAL.

[Under the act of Congress approved June 17, 1902, 32 Stat., 3 88.]

FOR THE CONSTRUCTION OF LATERAL IRRIGATION DITCHES, WITH STRUCTURES,
TRUCKEE-CARSON PROJECT, NEVADA.

To the SECRETARY OF THE INTERIOR.

Washington, D. C.

SIR: The undersigned propose to do all the work and furnish all the material, except cement and vitrified sewer pipe, in accordance with the advertisement and attached specifications, for the schedule as a whole, and bind ----- on the acceptance of this proposal to enter into and execute a contract with necessary bond, of which this proposal, the said advertisement, and specifications shall be made a part, for performing said work and supplying said material at the prices named in the schedule hereto annexed.

----- furthermore agree that, in case of ----- default in executing such contract with necessary bond, the check accompanying this bid and the money payable thereon shall be and remain the property of the United States.

In case of delay in letting the contracts, it is understood that all checks will be returned at the expiration of forty-five days from the date of opening bids.

----- agree to complete the work within the time fixed by the specifications. It is understood that the bids are for all material in place.

Signature-----

[CORPORATE SEAL.]

Address-----

Name of individual members of firm:

Name of president of corporation:-----

Name of secretary of corporation:-----

Corporation is organized under the laws of State of:-----

GUARANTY OF BOND.

We agree to furnish bond for this bidder, as required by these specifications, and the regulations of the Department of the Interior, in the sum of 20 per cent of the contract price, in case contract be awarded on the basis of this proposal.

Signature-----[SEAL.]

Address-----

Signature-----[SEAL.]

Address-----

Signature-----[SEAL.]

Address-----

SCHEDULE.

Excavations, embankments, and structures—145 miles of laterals and drains in district No. 3.

Item No.	Work or material.	Quantity and price.	Amount.
1	Excavation: Class 1.....	600,000 cubic yards, at..... (words)	
2	Class 2.....	5,000 cubic yards, at..... (\$.....) per cubic yard.....	
3	Overhaul.....	50,000 cubic yards, at one and one-half cents (\$0.015) per cubic yard per 100 feet..... (words)	
4	250 turnouts: Concrete.....	1,800 cubic yards, at..... (\$.....) per cubic yard.....	\$750.00
5	Cast iron.....	10,200 lbs., at..... (words)	
6	Steel rods for reinforcing concrete in place.....	6,500 lbs., at..... (\$.....) per pound.....	
7	Flashboards, with hooks.....	50, at..... (words)	
8	Redwood lumber, in place.....	225,000 ft. B. M., at..... (\$.....) each.....	
9	Backfilling.....	2,000 cubic yards, at..... (words)	
10	Paving.....	9,000 square yards, at..... (\$.....) per square yard.....	
11	Grouted paving.....	5,000 square yards, at..... (words)	
12	Puddling.....	2,600 square yards, at..... (\$.....) per square yard.....	
13	42 bridges: Clear Oregon pine lumber, in place.....	35,000 feet B. M., at..... (words)	
14	Oregon pine lumber, in place.....	80,000 feet B. M., at..... (\$.....) per M feet B. M.....	
15	Concrete.....	100 cubic yards, at..... (words)	
16	Culverts and flumes: Redwood and Oregon pine, in place.....	36,000 feet B. M., at..... (\$.....) per M feet B. M.....	
17	Pipe drains: Hauling and laying 16-inch sewer pipe.....	775 feet, at..... (words)	
18	Concrete.....	30 cubic yards, at..... (\$.....) per linear foot.....	
19	Steel I-beams, for foot walks, in place.....	1,200 pounds..... (words)	
		Total (\$.....) per pound.....	

SPECIFICATIONS.

INSTRUCTIONS TO BIDDERS.

1. *Form of proposal and signature.*—The proposal must be made on the form provided for that purpose, inclosed in a sealed envelope, and marked and addressed as required in the notice to bidders. It must state in writing and in figures the unit prices and the sum of money for which the bidder proposes to supply the materials and perform the work called for in the proposal and schedules. If the bid is made by an individual it must be signed with the full name of the bidder, whose address must be given; if it is made by a firm it should be signed with the copartnership name by a member of the firm, and the name and full address of each member should be given; and if it is made by a corporation it should be signed by an officer in the corporate name, and the corporate seal should be attached to such signature. No telegraphic proposal or telegraphic modification of proposal will be considered.

2. *Proposals.*—All blank spaces in the proposal must be filled in, and the phraseology of the proposal shall not be changed, and additions shall not be made to the items mentioned therein. Any conditions, limitations, or provisos attached to a proposal will be liable to render it informal and may cause its rejection. Alterations by erasure or interlineations must be explained or noted in the proposal over the signature of the bidder. If a bidder wishes to withdraw his proposal he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose to the officer who holds it. No bids received after the time set for opening the proposals will be considered. The right is reserved to reject any or all bids, to accept one part and reject the other, and to waive technical defects, as the interests of the Service may require. Bidders are invited to be present at the opening of proposals.

3. *Certified check.*—Each bidder must submit with his proposal a certified check for the sum stated in the notice to bidders, drawn to the order of the Secretary of the Interior. The proceeds of said check shall become the property of the United States if, for any reason whatever, the bidder withdraws from the competition after the opening of the bids or refuses to execute the required contract and bond if his bid is accepted. Checks will be returned after the approval of the contract and bond executed by the successful bidder.

4. *Award.*—The bidder to whom award is made will be required to enter into a written contract with the United States, and to furnish good and approved bond as herein specified, within ten days after receiving such contract for execution. The contract shall be, in its general provisions, in the form adopted by the Reclamation Service, copies of which can be inspected at its offices and will be furnished, if desired, to parties proposing to bid. If the bidder to whom the first award is made fails to enter into a contract as herein provided, the award may be annulled and the contract let to the next most desirable bidder in the opinion of the Secretary of the Interior; and such bidder shall be required to fulfill every stipulation embraced herein as if he were the original party to whom the award was made. A copy of the advertisement and of the general conditions and detail specifications will be attached to and form part of the contract. A corporation to which a contract is awarded will be required, before the contract is finally executed, to furnish certificate as to its corporate existence, and evidence that the officer signing the contract is duly authorized to do so on behalf of the corporation.

5. *Contractors' bond.*—The contractor will be required to give a bond in the sum of 20 per cent of the amount of the contract, unless a different sum is specified in the notice to bidders or proposal, conditioned upon the faithful performance by the contractor of all the covenants, stipulations, and agreements in the contract. If at any time during the continuance of the contract the sureties, or any of them, shall die, or in the opinion of the Secretary of the Interior, become irresponsible, the Secretary shall have the right to require additional and sufficient sureties, which the contractor shall furnish to the satisfaction of that officer within ten days after notice, and in default thereof the contract may be annulled by the Secretary of the Interior and the work carried to completion in the manner provided in the contract.

6. *Transfers.*—Transfer of a contract, or of any interest therein, is prohibited by law.

GENERAL CONDITIONS.

7. *Eight-hour law, foreign labor, and convict labor.*—In all construction work eight hours shall constitute a day's work, and no Mongolian labor shall be employed thereon. The importation of foreigners and laborers under contract to perform labor in the United States or the Territories or the District of Columbia is prohibited. (Section 3738, Rev. Stat., U. S.; act Aug. 1, 1892, 27 Stat. L., 340; section 4, act June 17, 1902, 32 Stat. L., 388; act Feb. 26, 1895, 23 Stat. L., 332, and act Feb. 23, 1887, 24 Stat. L., 414.) In the performance of this contract no persons shall be employed who are undergoing sentences of imprisonment at hard labor which have been imposed by courts of the several States, Territories, or municipalities having criminal jurisdiction. (Executive order, May 18, 1905.)

8. *Engineer.*—Where the word "engineer" is used in the general conditions or detail specifications, or in the contract, it shall be and is mutually understood to refer to the chief engineer of the Reclamation Service, or any of his authorized assistants or inspectors, limited by the particular duties intrusted to them. The engineer will give the locations and the grades for the work, and no work depending on such locations and grades will be commenced until these have been established, and the contractor shall provide such materials and give such assistance as may be required by the engineer. Upon all questions concerning the execution of the work, the classification of the material in accordance with the specifications, and the determination of costs, the decision of the chief engineer shall be binding on both parties. When two or more contractors are engaged on work in the same vicinity the engineer shall be authorized to direct the manner in which each shall conduct his work so far as it affects other contractors.

9. *Contractor.*—Whenever the word "contractor" is used it shall be held to mean the party, firm, or corporation with whom the contract is made by the United States for the construction of the work, the agent of this party who may be appointed to represent him in the execution of the work, or the legal representatives of the contractor. The foreman in charge of the work will be held to represent the contractor during the absence of the latter or his designated agent. The contractor shall give his personal attention to the faithful prosecution of the work and shall keep the same under his personal control.

10. *Foreman and copy of plans, etc.*—The contractor shall at all times keep upon the work a copy of the plans and specifications, so that reference may be made thereto by the engineer, in case of misunderstanding or misconstruction. Instructions given by the engineer to the contractor's foreman or agent on the work shall be considered as having been given to the contractor himself.

11. *Transportation.*—The contractor will afford opportunity to the engineer to obtain copies of the expense bills for transportation charges on all machinery, materials, and supplies shipped to and from the project for use in connection with the work under this contract. On most of the western railroads reduced rates are applicable for the transportation of laborers employed by the contractor, traveling in parties of five or more to or from the locality of the work, and allowance should be made therefor in submitting bids; full information concerning these rates can be obtained by application to the engineer in charge of the project.

12. *Local conditions.*—Bidders must satisfy themselves as to the nature of the material and as to all local conditions affecting the work, and no information derived from the maps, plans, specifications, profiles, or drawings, or from the engineer or his assistants, will in any way relieve the contractor from any risks or from fulfilling all the terms of his contract. No bid on work depending on local conditions will be considered unless the bidder, his representative, or his engineer has visited the work and made himself familiar with the conditions.

13. *Mortgaging of plant, etc.*—The contractor shall not, under any circumstances, give nor execute any mortgage, deed of trust, or other conveyance or instrument of any description, affecting or intended to affect his right, title, interest, or property in or to any plant, machinery, tools, appliances, materials, or animals, which may at any time be used in the prosecution of this contract.

14. *Damages.*—The contractor will be held responsible for and be required to make good, at his own expense, any and all damages, of whatsoever nature, to persons or property caused by carelessness, neglect, or want of due precaution on the part of the contractor, his agent, employees, or workmen. He will not allow any of his agents, employees, or workmen to trespass upon the premises

or lands of persons in the vicinity of the works, and will discharge, at the request of the engineer, anyone in his employ who may be guilty of committing such damage.

15. *Drawings and specification requirements.*—Any drawings or plans which may be listed in the detail specifications shall, together with such detail specifications, be regarded as forming part hereof and of the contract. The engineer will furnish from time to time such detail drawings, plans, profiles, and special specifications as may be necessary to enable the contractor to complete the work in a satisfactory manner. The general conditions and detail specifications shall apply to all work done or material furnished, and shall control the special specifications where the latter are silent. **In case of conflict in the general conditions, the detail specifications, and the special specifications, the last shall control in the particular work to which they apply.**

16. *Experience.*—Bidders must, if required, present satisfactory evidence that they have been regularly engaged in the business of constructing such work as they propose to execute, and that they are fully prepared with the necessary capital, machinery, and material to begin the work promptly and to conduct it to the satisfaction of the Department.

17. *Character of workmen.*—The contractor shall discharge from his service, when required by the engineer, any disorderly, dangerous, insubordinate, or incompetent person employed on or in the vicinity of the works under construction by the United States. None but skilled foremen or workmen shall be employed on work requiring special qualifications.

18. *Methods and appliances.*—The methods and appliances adopted by the contractor must be such as will secure a satisfactory quality of work and enable him to complete the work in the time agreed on. If at any time such methods and appliances appear inadequate, the engineer may order the contractor to improve their character or increase their efficiency, and the contractor must conform to such order; but the failure of the engineer to order such improvement of methods or increase of efficiency will not relieve the contractor from his obligations to perform good work or finish it in the time agreed upon.

19. *Material and workmanship.*—All materials must be of the specified quality and fully equal to approved samples, when samples are required. All work must be done in a thorough, workmanlike manner by mechanics skilled in their various trades, notwithstanding any omission from the drawings or specifications; and anything mentioned in the specifications, and not shown in the drawings, or shown in the drawings and not mentioned in the specifications, must be done as though shown or mentioned in both. All materials furnished and all work done shall be subject to rigid inspection, and if not in accordance with the specifications, in the opinion of the engineer, shall be made to conform thereto. Unsatisfactory material will be rejected and shall be immediately removed from the premises, at the cost of the contractor, if so ordered by the engineer.

20. *Samples or specimens.*—The contractor shall submit samples or specimens of any or all materials proposed to be used in the work if required to do so by the engineer.

21. *Delays.*—The contractor shall not be entitled to any compensation for delays or hindrances to the work from any cause whatever. Extension of time will be allowed for unavoidable delays, such as may result from causes which, in the opinion of the engineer, approved by the Secretary of the Interior, are beyond the control of the contractor, such as acts of Providence, fortuitous events, or the like. If any delay or hindrance is caused by specific instructions on the part of the Secretary of the Interior or the engineer, or by their failure to provide material sufficient to carry on the work, or to give such instructions as may be necessary for the same, or to provide necessary right of way, then such delay will entitle the contractor to an extension of time equivalent to the time lost by such delay. The engineer must receive from the contractor a written notice of claim for such delay before any extension of time will be allowed. Any extension of time, however, shall not release the sureties from their obligation, which shall remain in full force and effect until the discharge of contract. Any application for an extension of time must be accompanied by the formal consent of the sureties thereto; or other sufficient sureties must be furnished by the contractor. In case the contractor should fail to complete the work in the time agreed upon in the contract, or in such extra time as may have been allowed for delays as herein provided, the engineer shall compute and appraise the direct damages for the loss sustained by the United States on account of further employment of engineers, inspectors, and other

employees, including all disbursements on the engineering account, properly chargeable to the work. The amount so appraised and computed is hereby agreed upon as liquidated damages, and shall be deducted from any money due the contractor under his contract, and the contractor and sureties shall be liable for any excess. The decision of the chief engineer as to the appraisal of such damages shall be final and binding on both parties. Any provisions in the detail specifications concerning deduction for delay shall be held as modifying or revoking the provisions herein.

22. *Suspension of contract.*—Should the contractor fail to begin the work within the time required, or fail to begin the delivery of material as provided in the contract, or fail to prosecute the work or delivery in such manner as to insure a full compliance with the contract within the time limit, or should any question arise as to whether or not the contractor is properly carrying out the provisions of his contract in their true intent and meaning, at any time during the progress of the work, notice thereof in writing shall be served upon him, and upon his neglect or refusal to provide means for a more energetic and satisfactory compliance with the contract within the time specified in such notice, then and in either case the Secretary of the Interior shall have the power to suspend the operation of the contract, and he may take possession of all machinery, tools, appliances, and animals employed on any of the works to be constructed under the contract, and of all materials belonging to the contractor delivered on the ground, and may use the same to complete the work, or he may employ other parties to carry the contract to completion, substitute other machinery or materials, purchase the material contracted for in such manner as he may deem proper, or hire such force and buy such machinery, tools, appliances, materials, and animals at the contractor's expense as may be necessary for the proper conduct of the work and for finishing it in the time agreed upon. Any excess of cost arising therefrom over and above the contract price will be charged against the contractor and his sureties, who shall be liable therefor. The failure to order improvement of methods or increase of force, plant, or efficiencies will not relieve the contractor from his obligation to perform good work or finish in the time agreed upon. In the determination of the question whether there has been such noncompliance with the contract as to warrant the suspension thereof, the decision of the Secretary of the Interior shall be binding upon both parties.

23. *Climatic conditions.*—The engineer may order the contractor, to suspend any work that may be damaged by inclemency of the weather or other climatic conditions, and due allowance shall be made to the contractor for the time actually lost by him on account of such suspension.

24. *Quantities.*—The quantities given in the proposal are for the purpose of comparing bids, and are approximate only, and no claim shall be made against the United States on account of any excess or deficiency, absolute or relative, in the same.

25. *Changes.*—The Secretary of the Interior reserves the right to make such changes in the quantities of work or material at any time as may be deemed advisable, without notice to the surety or sureties on the bond given to secure compliance with the contract, by adding thereto or deducting therefrom, at the unit prices of the contract. Should any change be made in a particular piece of work after it has been commenced, so that the contractor is put to extra expense, the engineer shall make reasonable allowance therefor, which action shall be binding on both parties. Extra work or material will be paid for as hereinafter provided.

26. *Extra work or material.*—Extra work or material of a character not provided for in the specifications, if ordered in writing by the engineer, will be paid for at actual necessary cost, as determined by the engineer, plus 15 per cent for profit, superintendence, and general expenses. The cost of extra work shall include all materials, labor, and fuel furnished by the contractor; but shall not include cost of tools or machinery, office expenses, general superintendence, and general expenses. Demand for payment must be made in writing by the contractor promptly upon the completion of the extra work or furnishing of the extra material. The account including the same must be accompanied by the certificate of the engineer stating amount to be allowed therefor. The contractor shall, when requested by the engineer, furnish itemized statements of the cost of the work ordered, and give the engineer access to accounts, bills, and vouchers relating thereto.

27. *Structural difficulties.*—Should structural difficulties prevent the execution of the work as described in the plans and specifications, necessary deviations

therefrom may be permitted by the engineer, upon written request of the contractor, but must be without additional cost to the United States.

28. *Inspection of work.*—The engineers and inspectors appointed by the Secretary of the Interior shall at all times have the right to inspect the work and materials. The contractors shall furnish such persons reasonable facilities for obtaining such information as they desire respecting the progress and manner of the work and the character of the material, including all information necessary to determine the cost of the work, such as the number of men employed, their pay, the time during which they worked on the various classes of construction, etc. He shall, when required, furnish the engineer and his assistants meals and camp accommodations at reasonable prices at any camp under his control. Whenever the contractor shall be permitted or directed to perform night work, or to vary the period during which work is carried on each day, he shall give due notice to the engineer, so that proper inspection may be provided for. Such work shall be done under regulations to be furnished in writing by the engineer, and no extra compensation shall be allowed therefor.

29. *Removal of defective work.*—The contractor shall remove and rebuild, at his own expense, any part of the work which has been improperly executed, even though such work should have been already allowed for in the monthly estimates. The engineer shall give to the contractor written notice of such defective work, when found. If the contractor refuses or neglects to replace such defective work, it may be replaced by the United States at the contractor's expense.

30. *Protection of finished work and cleaning up.*—The contractor will be held responsible for any material furnished to him, and for the care of any finished work until final completion of the work, and will be required to make good, at his own cost, any damage or injury it may sustain from any cause. He shall take all risks from floods and casualties of every description and make no charge for detention from such causes. He may, however, be allowed a reasonable extension of time on account of such detention, as provided herein. The contractor shall remove all rubbish and unused material upon completion of the work and place the premises in a condition satisfactory to the engineer.

31. *Errors and omissions.*—The contractor will not be allowed to take advantage of any error or omission in these specifications, as full instructions will always be given should such error or omission be discovered.

32. *Roads and fences.*—All roads crossing the work and subject to interference therefrom must be kept open until proper bridges or crossings are provided, if necessary; and all fences crossing the work must be kept up by the contractor until the work is finished.

33. *Bench marks, stakes, etc.*—All bench marks, witness and side-slope stakes must be carefully preserved by the contractor, and in case of their destruction or removal by him or any of his employees such stakes shall be replaced by the engineer at the contractor's expense.

34. *Right of way.*—The right of way for the works to be constructed and for all necessary borrow pits, channels, spoil banks, ditches, roads, etc., will be provided by the United States.

35. *Sanitation.*—The chief engineer may establish rules for sanitary and police regulations for all forces employed under this contract; and should the contractor fail to enforce these rules, the engineer may enforce them and assess against the contractor the cost thereof, which will be deducted from any sum due on the contract.

36. *Use of liquor.*—The use and sale of intoxicating liquor is absolutely prohibited on the work except under the direction and supervision of the engineer or his agent, and then only for medicinal purposes.

37. *Claims for work and material.*—The contractor shall promptly make payments to all persons supplying labor and materials in the prosecution of the work, and a condition to this effect shall be incorporated in the bond to be given by the contractor, in pursuance of the act of Congress approved August 13, 1894 (28 Stat. L., 278), and acts amendatory thereof.

38. *Payment.*—The payments due shall be made to the contractor upon the presentation of proper accounts, prepared by the engineer and approved by the chief engineer, in accordance with the provisions made therefor and pertaining to the contract. When the work has been completed or all the material has been delivered to the satisfaction of the chief engineer, and when a release of all claims against the United States on account of the contract shall have been executed by the contractor, final payment of the balance due will be made.

DETAIL SPECIFICATIONS.

39. *The requirement.*—It is required that there be constructed and completed a system of lateral distributing ditches, with necessary structures, for the irrigation of lands in Carson Sink Valley, in the vicinity of Saint Clair and Hill, Nev.

40. *List of drawings:*

- No. 1 (7531) Map of lateral distribution system.
- No. 2 (7607) Profiles and sections of ditches.
- No. 3 (7608) Profiles and sections of ditches.
- No. 4 (7609) Profiles and sections of ditches.
- No. 5 (7649) Profiles and sections of ditches.
- No. 6 (7650) Profiles and sections of ditches.
- No. 7 (7583) Plans of typical concrete turnouts.
- No. 8 (7584) Plans of typical timber turnouts.
- No. 9 (7585) Plans for highway bridges.
- No. 10 (7586) Plans for timber culverts.
- No. 11 (7587) Plans for pipe culverts.
- No. 12 (7588) Plans for structures at "A A" 70 + 00.
- No. 13 (7591) Plans for structures at "A A" 147 + 00.
- No. 14 (7592) Plans for structures at "A A" 159 + 40.
- No. 15 (7593) Plans for structures at "A A" 187 + 50.
- No. 16 (7594) Plans for structures at "A A" 241 + 00.
- No. 17 (7595) Plans for structures at "A A" 318 + 90.
- No. 18 (7596) Plans for structures at "A A" 342 + 00.

41. *Classification of material.*—All material moved in grading will be measured in excavation only and estimated by the cubic yard under the following classes:

Class 1. All material that can be plowed by an average six horse or mule team, each animal weighing not less than fourteen hundred pounds, attached to a suitable breaking plow, all well handled by at least three men; also all loose material occurring in the above that can be loaded into a scraper by two men acting jointly.

Class 2. Indurated material of all kinds that can not be plowed as in class 1, but that require loosening by powder and can then be removed in scrapers.

42. *Ditch and embankment sections.*—The laterals, ditches, and cuts shall be excavated accurately to sections and forms similar to those shown in drawings Nos. 2 to 6, and to the lines, grades, and slope stakes as established by the engineer. The side slopes will be varied to suit the material, but in all cases will be staked out by the engineer. Top width will vary with the height, but in all cases will be fixed by the engineer.

43. *Disposition of material.*—When a ditch or cut is on sloping ground, the material excavated therefrom shall be deposited on both sides to form the top portion of the waterway. If there is an excess of material in excavation over that which is necessary to complete the waterway to the level given by the engineer, it shall be deposited on the outside of the finished banks as directed by the engineer, but in the case of adjacent parallel laterals and waste ditches such excess material shall be deposited between the lateral and waste ditch, unless otherwise directed by the engineer, the purpose being to use the excess material excavated from the waste ditch, first, to supply any deficiency of material for the waterway of the adjacent lateral, and, second, for the grading of a roadway between such ditches.

44. *Overhaul.*—All suitable material taken from the excavation must be placed where directed by the engineer. All haul over 200 linear feet will be paid for at the rate of one and one-half cents per cubic yard per 100 feet additional haul.

45. *Borrow pits.*—Where there is not sufficient suitable material inside the lines of the ditches or cuts for banks, the engineer will designate the place where such material is to be obtained, and will measure and allow for such material in excavation only, with allowance for required overhaul. The estimated quantities given in the specifications are for the material in place before being excavated.

46. *Preparation of surface.*—Wherever banks are made on the side of a ditch or cut to form part of the waterway, or wherever embankments are made to divert or restrain water, the ground under the same must be entirely stripped of all brush and vegetable matter of every kind, the roots grubbed out and burned with the other material removed, and the ground well plowed.

47. *Formation of banks.*—All banks, where required for forming part of the waterway, or for diverting or restraining water, shall be thoroughly compacted

and built of material free from organic matter to the elevation given by the engineer to allow for settlement.

48. *Embankments.*—All embankments shall be brought to a uniform grade, with such width of top and such side slopes as may be designated by the engineer. When required, the top of the bank on one side of the ditch shall be modified so as to form a roadway. All embankments at or near structures shall be made to such heights, in such manner, and of such material as the engineer may direct.

49. *Material laid aside.*—When any material, such as sand, gravel, stone, etc., suitable for use in structures or for puddling, is found in the excavations, it shall be laid aside in some convenient place if so ordered by the engineer. No extra allowance will be made for this work if the material is deposited within 200 linear feet of the place where it is excavated.

50. *Finishing work.*—The excavations and embankments shall be finished in a careful and workmanlike manner, true to line and grade as given by the engineer's finishing stakes. The bottoms and side slopes of all ditches and cuts must be made even and regular, suitable for the passage of water. Runways must not be cut into the side slopes except with the express permission of the engineer.

51. *Drainage and irrigation.*—If it is necessary in the prosecution of the work to interrupt or obstruct the natural drainage of the surface, or the flow of artificial drains or of irrigation ditches, the contractor shall provide for the same during the progress of the work in such a way that no damage shall result to either public or private interests. In case of any neglect so to provide, for either natural or artificial drainage or irrigation that he may have interrupted, he shall be held liable for all damages that may result therefrom.

52. *Turnouts.*—Turnouts will be constructed of concrete and timber, and of the general type shown on drawings numbers 7 and 8, as directed by the engineer.

53. *Pipe drains.*—Culverts or drains of 15-inch vitrified sewer pipe, with cement and gasket joints, and concrete bulkheads at each end, will be placed under ditches at various points. Fifteen-inch vitrified sewer pipe will be furnished by the Government f. o. b. cars at Hazen, Nevada. The contractor will be held responsible for demurrage to the railroad company and for any loss or breakage of pipes after delivery at the railroad station. The contractor must give the engineer at least thirty days' notice as to his needs for pipe. The price bid is understood to be per linear foot in place in the work, including haulage from railroad station, excavation, joint gaskets, and all other incidentals appurtenant thereto.

54. *Highway bridges.*—Highway bridges, with varying lengths of span, and all of the types shown on drawing number 9, will be erected across the laterals and ditches at their intersection with section lines and at such other points as shall be designated by the engineer.

55. *Puddling.*—Earth filling around structures, and at other points where required by the engineer, shall be puddled, and for this purpose shall be of material selected or designated by him. It shall be wet to saturation and tamped or rolled thoroughly to the satisfaction of the engineer.

56. *Backfilling.*—All backfilling around structures not puddled shall be of such material as shall be designated by the engineer. It shall be carefully placed and compacted to the satisfaction of the engineer.

57. *Paving.*—Dry paving on canal banks and bed, when required, will be paid for by the square yard. It will not be less than 1 foot thick, and the stones must have a minimum thickness of 12 inches. The spaces between these stones must be filled with spawls, small stones, or coarse gravel, all to be placed to the satisfaction of the engineer.

58. *Timber.*—All timber must be of good quality red fir, commercially known as Oregon pine, and redwood, free from sap, shakes, loose or rotten knots, or other defects that would impair its strength or durability. The floor joists of all highway bridges must be of first-quality, clear, straight-grained red fir (Oregon pine). All timber turn-outs will be built of redwood, but red fir (Oregon pine) flashboards will be used.

59. *Cast iron.*—Cast iron must be of the best quality of soft gray iron, free from cinders, blowholes, or other imperfections, and castings must be true to the shape and dimensions required. No plugging of holes will be allowed.

60. *Concrete.*—This includes all concrete in place. The concrete to be used on all of the structures on this canal will be composed of Portland cement, sand, and gravel (or broken stone), in the proportion of 1 barrel of cement, in the packed condition in which it is sold, to 7 full barrels of the same size of the

aggregates when mixed together. To facilitate the work, experiments will be made by the contractor with the carriers—whether wheel barrows, boxes, or cars—used by him, so that this proportion of cement to aggregates may be maintained as nearly as possible; and the engineer will supervise these experiments and fix said proportion for the kind of carrier used at each piece of work. He will also make experiments with the aggregates themselves, so as to get the most compact mass that can be made from them, and for such experiments no extra allowance will be made to the contractor. If the cement is delivered in sacks, 4 sacks of 94 pounds net each shall constitute a barrel. Any ordinary cement barrel, open at one end and containing not more than 3.7 cubic feet, may be used for measuring the aggregates.

61. *Broken stone, sand, and gravel.*—If broken stone is used it must be hard and compact, and satisfactory to the engineer. The entire product of the crusher will be taken, provided not more than 20 per cent of the volume is composed of dust or screenings. All of the rock must be of such sizes as will pass through a screen with 2-inch square holes. If gravel is used it must be clean, hard, and heavy, having a specific gravity of at least two. None of the gravel is to exceed two inches in diameter. The sand must be free from any organic matter and satisfactory to the engineer.

62. *Mixing concrete.*—It is preferred that the concrete shall be mixed by machine. If hand labor is used, it will be done in the following manner: A tight floor of either planks or sheet iron will be used for the mixing in all cases. The sand, which must be dry, will first be piled on the floor with the cement in the proper proportions; the mass will then be shoveled over as many times as are necessary to make a thorough mixture of sand and cement; sufficient water will then be added to make a stiff mortar, and the mass will be shoveled over twice or more, as may be necessary. The stone or gravel, which should be thoroughly wet, will then be added, and the entire mass shoveled over twice or more before shoveling into the carriers. This mixing must be done to the satisfaction of the engineer. If the mixing is done by machine, the machine will be subject to approval by the engineer. If at any time the machine fails to perform the mixing in a manner satisfactory to the engineer, it must be made satisfactory or removed and another machine substituted therefor, or mixing by hand must be resorted to.

63. *Water for mixing concrete.*—The water used for mixing must be free from vegetable matter. The amount of water used, both in mixing the concrete and in seasoning it after it is placed in the work, must be satisfactory to the engineer.

64. *Cement.*—The cement will be furnished by the United States and will be delivered to the contractor on board the cars at Hazen, Nev. The contractor will be held responsible for demurrage to the railroad company and will haul the cement from the railroad station to the work. He will furnish suitable warehouses or sheds near the work for storing the cement until used, and will be held responsible for any loss of cement after its delivery at the railroad station. The contractor must give the engineer at least thirty days' notice as to when he wants the cement delivered, and will state the amount required, which must be expressed in car loads.

65. *Placing rock in concrete walls.*—In all concrete walls over two feet thick hard boulders or fragments of hard, sound rock, not exceeding one foot or not less than six inches in any dimension, shall be placed by hand in the soft concrete, provided no such stone comes nearer than four inches to the exterior surface of the wall, or to any other boulder or stone so placed.

66. *Depositing concrete.*—Under no circumstances is concrete to be laid in running water or on a muddy foundation, and it must always be mixed and laid in the presence of an inspector and to his satisfaction. All concrete must be placed in the work as soon as possible after being mixed, and any portion of a batch which may remain in the place of mixing longer than the time required by the cement for its initial set must not be remixed, but removed from the vicinity of the work. All concrete shall be well tamped, if put in dry, with heavy tamping bars, until moisture appears on the surface, and if wet, with suitable bars and shovels, so that porosity and rough surface may be avoided.

67. *Concrete surfaces.*—Concrete will be used "wet" wherever practicable, and "dry" only when the nature of the work renders its use unavoidable. The wooden forms for concrete must be surfaced on the insides, so that all concrete structures may be smooth and true on their exposed surfaces when finished. If necessary, special flat shovels shall be furnished and used by the contractor to effect this purpose.

68. *Cement sacks.*—The contractor will be required to take proper care of all empty cement sacks in which cement has been delivered to him, and to return the same in serviceable condition to the United States at its office in Hazen. All sacks not so returned in serviceable condition must be paid for by the contractor at the rate paid by the United States. If the contractor fails or refuses to pay for any sacks not so returned, their value will be deducted from any money due him under the contract.

69. *Commencement, prosecution, and completion of work.*—The work shall be prosecuted continuously and vigorously with such force and in such manner as to secure its completion by February 28, 1907. The contractor shall begin work within thirty days after signature of the contract by the Secretary of the Interior, and within ninety days after such signature shall have upon the work force and equipment sufficient, in the judgment of the engineer, to complete the same within the time specified. The work shall be completed by February 28, 1907.

70. *Failure to complete work in time agreed upon.*—In case the work is not completed on or before the date agreed upon, a per diem deduction of \$40.00 will be made from any amount due on the contract for each and every day occupied in excess of the time agreed upon in this contract as liquidated damages for the loss to the United States on account of engineering, superintendence, and the value of the operation of the irrigation works dependent thereon. This deduction shall be in lieu of that provided for under paragraph 21.

71. *Payments to contractors.*—At the end of each calendar month the engineer will make an approximate measurement of all the work done up to that date and an estimate of the value of the same at the prices agreed upon in the contract. A deduction of 10 per cent shall be made from this estimated amount, and from the balance shall be deducted the amount of all previous payments. The remainder shall be paid to the contractor upon the presentation of proper accounts. The 10 per cent so deducted shall be retained by the United States until the work shall have been completed to the entire satisfaction of the Chief Engineer, and in the case of default by the contractor, said 10 per cent shall be and become the sole and absolute property of the United States. The balance due upon completion of the work shall be paid as provided in paragraph 38.

72. *Freight bills.*—The contractor shall furnish copies of railroad freight bills for all classes of shipments when required by the engineer.

COMMITTEE ON IRRIGATION OF ARID LANDS,

Monday, April 23, 1906.

The committee this day met, Hon. Frank W. Mondell in the chair.

The CHAIRMAN. We will continue with the hearing of Mr. Newell.

STATEMENT OF MR. F. H. NEWELL, CHIEF ENGINEER RECLAMATION SERVICE—Continued.

Mr. NEWELL. In the systematic discussion we have come down through the divisions of work to the operations in the field under supervising engineers in charge of districts, as shown on this general map. The committee has heard Mr. H. N. Savage, in charge of the work in Montana, North Dakota, and northern Wyoming. Mr. D. C. Henny, in charge of the work in Washington and Oregon, will be here on the 25th, and if possible I hope that the committee will hear him, as the situation in those States has been difficult. A large amount of money has been derived from the sale of lands in those States. The conditions for reclamation have been quite difficult on account of the legal and other complications. So I think Mr. Henny's explanation, fresh from the field, will be of interest.

THE SALT RIVER PROJECT, ARIZONA.

Taking the other divisions up in regular order, Arizona comes next. The work is under Mr. Louis C. Hill, supervising engineer, with office at Phoenix and suboffices at Roosevelt and Livingston.

Mr. REEDER. Is that connected with the same project?

Mr. NEWELL. Yes, sir. Livingston is a town which will be flooded as soon as the water is put in. It is up the valley from Roosevelt. The reservoir on Salt River will be one of the largest in the world. The contract for the dam has been let to John M. O'Rourke & Co., the contractors who have lately finished the sea wall at Galveston, Tex. The work of the contractors has been seriously interfered with, owing to the unusual floods in November, 1905. The preliminary work was washed out in part, and the contractors have been waiting for the river to subside. The recent floods have contributed enough water to fill up the reservoir three times in succession. These floods were of extraordinary character, shown by the fact that the railroad bridge has been washed away, I think, seven times during the last year, cutting off all communication, so that the work which has been carried on has been under very great difficulty.

The CHAIRMAN. The railroad bridge at what point?

Mr. NEWELL. Connecting Maricopa and Phoenix.

The CHAIRMAN. The bridges we crossed last summer?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. Is that the first time the bridges have gone down since they were put up?

Mr. NEWELL. Yes, sir. It is practically the first time that travel has been interrupted for any considerable length of time.

The CHAIRMAN. Do you expect to put an end to that sort of thing when the dam is completed, unless one great flood should follow another?

Mr. NEWELL. Yes, sir; so far as Salt River is concerned.

The principal work accomplished so far has been the establishing of permanent ways of communication to the point of work from the Salt River Valley. The dam is 63 miles from the nearest point in the valley on the railroad, Mesa, and is 40 miles from Globe. Globe is at the end of a branch railroad line leaving the Southern Pacific at Bowie, Ariz. The first work to be done was to build 63 miles of wagon road from Mesa, in the Salt River Valley, up to the dam site. Forty-three miles of that is heavy rock road. That work has been finished, forming one of the best wagon roads in the country. There is a million pounds of freight transported over that road a month. At the same time it was necessary to build at the dam a cement mill for manufacturing upward of 200,000 barrels of Portland cement for use on the dam.

The offers originally made by the cement manufacturers, with the freight rates added, were so high that the cost of the work would have been prohibitory unless we could have obtained cheaper cement. Finding cement-making material on the ground, we proceeded to erect a mill and have one of two-kiln capacity, one kiln of which has been running continuously for several months and producing a cement which is above the ordinary commercial standard. The importance of the mill is shown by the fact that the demand for Portland cement is now so great in the West that we can not procure the material at any reasonable price, the manufacturers saying that the product is engaged for months to come.

The CHAIRMAN. You ran that mill for a long time with steam power and were obliged to buy wood for fuel?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. That wood was quite expensive, I understand?

Mr. NEWELL. We cut it from adjacent lands at the cost of labor for cutting and hauling.

The CHAIRMAN. Which was quite high?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. In view of the expensive fuel cost, which, of course, could not be avoided, have you in mind about what the cost per barrel was, taking into consideration a fair amount for the use of the machinery, at the time you were using the steam power?

Mr. NEWELL. The cost of operating the mill at half capacity, one kiln with power generated by steam, has been estimated to be about \$4 a barrel. We have now done away with the steam power. We have made the cement which we needed immediately and now have water power by which we are able to operate the mill.

The CHAIRMAN. Four dollars a barrel is very much above the ordinary commercial cost.

Mr. NEWELL. It would have cost us much more to have purchased it and hauled it in to the dam site.

The CHAIRMAN. I mean the ordinary commercial cost of manufacture at the mill?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. What do you estimate that you can make the cement for under present conditions, using the water power?

Mr. NEWELL. Running the mill at full capacity with water power we can make it less than \$2 a barrel.

The CHAIRMAN. That includes some fixed charge for the use of the machinery?

Mr. NEWELL. Yes, sir. We estimate when we have manufactured all the cement that it may be necessary to abandon the plant.

Mr. REEDER. When you manufacture the cement by water power you furnish the heat by oil?

Mr. NEWELL. Yes, sir.

Mr. REEDER. Did you furnish this heat by oil to make the cement during the time you were using steam?

Mr. NEWELL. Yes, sir; the same heat is used.

The CHAIRMAN. When we were at the Roosevelt dam the man in charge of the cement mill said that he had gotten some very remarkable results from his tests; that the cement he was making there was much stronger than the average commercial cement.

Mr. NEWELL. Yes, sir; we are running above the commercial tests.

Mr. RAINEY. If it were possible to buy cement in the open market in the quantities you need there, how much would it cost per barrel?

Mr. NEWELL. That is a difficult question to answer. We can not buy it at all at present. It is not so much the cost at the mill as the transportation. We have had various figures, which show an estimated cost of all the way from \$5 to \$9 a barrel.

Mr. KENNEDY. Where do you get the material out of which you make the cement?

Mr. NEWELL. We get it at the mill. The quarry is immediately above the mill, and the rock is taken out and is dropped into the mill by gravity.

The CHAIRMAN. You bring the clay about 2 miles?

Mr. NEWELL. We have now a clay bank very near the mill—about three-quarters of a mile away.

Mr. KENNEDY. Have you plenty of material to manufacture all the cement they want?

Mr. NEWELL. We could manufacture several million barrels if it was desired.

The CHAIRMAN. Some of the members of the committee have never gone over this particular matter, and I think it would be well, Mr. Newell, if you would state briefly the peculiar conditions you found at the Roosevelt dam that led to the necessity of putting in a cement plant, which is contrary to the usual custom?

Mr. NEWELL. The dam is located so far from railroads and is reached over wagon roads so bad that the cost of transportation would practically prohibit bringing to the dam site any heavy articles in the nature of cement. That is to say, if the cement had been given to us at the nearest railroad station, it would have been cheaper to manufacture it on the ground than to haul it to the dam site. The same condition exists as to the other materials, such as the brick and lumber; it would be cheaper to make them on the ground, to burn our own charcoal and brick and saw our own lumber, to provide everything, including water and all items necessary for subsistence of men and animals.

Some parts of our machinery required upwards of six months for transportation over the rough roads which existed at the outset. We were forced by necessity to do a great many things in a pioneer way which are not necessary where works are built within reach of a railroad. We have now gotten beyond the pioneer condition. We have a complete cement mill and an excellent power plant which will furnish power not only to operate the cement mill and all the other mills in the vicinity, but from which power can be transmitted down the valley by electricity and used for pumping water for irrigation. We have a temporary machine shop, a sawmill, and ice plant, and sand-crushing machinery, and everything which is necessary to make it possible for men to live with any reasonable degree of comfort in that extremely hot climate.

Mr. KENNEDY. You mean that you have an ice plant for the artificial manufacture of ice?

Mr. NEWELL. Yes, sir. For six months of the year it is absolutely necessary to have an adequate supply of ice, not only for preserving supplies, but also for the hospital, and for the comfort of the men working in the mills and offices. It is one of the necessities of life where the temperature runs up for days to 120° in the shade.

The CHAIRMAN. On page 81 of your report you give as the cost of the cement plant the sum of \$246,583. That includes all of the expenses properly chargeable against the item of construction of that plant?

Mr. NEWELL. There is included in that an item of over \$5,000 for fuel oil that should go into the cement.

The CHAIRMAN. Rather than into the construction account?

Mr. NEWELL. Yes, sir. There are certain other items of machinery and motors with which the mill would be credited when it is dismantled and the motors used for the development of power for pumping.

The CHAIRMAN. Those motors are the motors used at the power plant?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. And not motors used for the mill?

Mr. NEWELL. No, sir. There is quite an amount of machinery involved in that mill, which has been designed for ultimate use elsewhere, and for the time being charged up to the mill with the idea of crediting it when taken away.

The CHAIRMAN. You have a pretty large item of \$170,000 for construction of foundations, etc., and operation?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. The charges for operation included in that item I suppose are only the preliminary testing operations?

Mr. NEWELL. It includes all the operations up to that time. We charge everything up to the plant and then as the cement is issued from the storehouse we credit the plant.

The CHAIRMAN. You credit the plant with the cement?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. At what you consider a reasonable price?

Mr. NEWELL. Yes, sir; at about \$4 per barrel for the first lot of cement, and when it is running full we will credit about \$2 per barrel. In the early bookkeeping on this project we followed the precedent of the Government bookkeeping. A little over a year ago we began to apportion the items on the basis of the larger experience obtained. We are now making very careful analyses of the expenditures on the basis of this later knowledge, and will credit back a good many items which in the aggregate appear large because they have not been properly apportioned.

Mr. COOPER. Up to September 30, the date of this report, about how many barrels of cement had been made?

Mr. NEWELL. Probably 20,000 barrels of cement.

Mr. COOPER. Then there would be a credit of something like \$80,000?

Mr. NEWELL. I am not sure on that point. We have been operating at some disadvantage on account of the new machinery and the distance from supplies.

The CHAIRMAN. I notice, Mr. Newell, that the amount under the heads of "Roads" is \$327,615.69. That includes the Globe road as well as the main, or Mesa, road?

Mr. NEWELL. That includes the road from Mesa to Roosevelt, which is the permanent road. It also includes a road from Roosevelt up through Livingston to Globe and a high-line road from Roosevelt to Globe around the reservoir, and also the road from Livingston up into the Sierra Ancha Forest Reservation, where the sawmill is located. It also includes a part of the road running up on the west side of the reservoir to the basin. That road is not yet finished.

Mr. COOPER. In this total is there any credit given for the amount paid in or subscribed by the towns of Mesa and Yuma and possibly Phoenix—some \$80,000?

Mr. NEWELL. That is not included in our account. That amount was placed in the form of a trust fund in the local banks, and the vouchers were sent directly to the banks. So it does not appear on the books of the Government.

The CHAIRMAN. You did the work and they paid a certain proportion of the cost out of the fund?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. How much did it amount to?

Mr. NEWELL. A little over \$80,000. It was supposed to be about \$100,000, but some of the bonds were not completed. I think there is still a balance which is to be expended.

Mr. COOPER. What arrangement, if any, was made between the Government and the towns that paid this money as to the future use and control of the roads?

Mr. NEWELL. There was no arrangement. That is, the amount of money contributed by the towns was spent on the part of the road nearest to the towns and was expended under auditing by a committee of townspeople in the form of vouchers approved by our engineers.

The CHAIRMAN. Some of this work was done on county roads already established?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. The new Mesa-Roosevelt road was not an established road?

Mr. NEWELL. No, sir.

The CHAIRMAN. Is that to be made a county road?

Mr. NEWELL. That has not been determined. A portion of it up to Goldfield is a county road and is being maintained by the county. From there on we have claimed and put up signs that it is Government reservation and can be used only under certain regulations.

The CHAIRMAN. Is that all in one county?

Mr. NEWELL. No, sir; the road is in two counties—Maricopa and Gila. The upper county, Gila, has less interest in the road.

The CHAIRMAN. I think the question will be whether or not ultimately the owners of the land under the canal must take care of those roads or pay the expense of maintaining the same, or whether that expense should be borne by the county generally?

Mr. NEWELL. A number of questions of that kind must be settled as they arise.

The CHAIRMAN. There is no great hurry, I should say, about settling that question.

Mr. COOPER. Do you propose to include the cost of those roads in the cost of the irrigation of the land to be charged up at so much per acre?

Mr. NEWELL. Yes, sir; the orders of the Secretary are that every dollar shall come back.

Mr. KENNEDY. In the meantime will it cost much to maintain those roads?

Mr. NEWELL. Not very much, except in time of exceptional cloud-bursts, such as we had last winter.

Mr. KENNEDY. But the maintenance of the roads will be absolutely necessary in the prosecution of the work?

Mr. NEWELL. Yes, sir; it is a part of the agreement with the contractor that we shall maintain the roads. We have road gangs out that patrol about 10 miles of road a day.

The CHAIRMAN. Mr. Newell, when do you expect to have the Roosevelt dam completed so as to fully control the waters of the Salt River?

Mr. NEWELL. The contractor has a time limit on his contract which expires in April, 1907, but the exceptionally bad weather that has prevailed may necessitate giving him an extension. He will probably apply for an extension.

The CHAIRMAN. So that you can not be sure of controlling the river fully before the irrigation season of 1909?

Mr. NEWELL. No, sir. We will, however, be able to deliver a great deal of water before that time. Our contract calls for putting in the foundations as quickly as possible and then building up to 150 feet above low-water mark, and then building only in the cooler time in order that the masonry may be set during the relatively cool weather and be in compression during the hot weather.

We expect that the temperature will influence the structure. We are studying carefully the effect of the temperature. The lower part of the dam, being underground, will not be affected. The temperature there is practically uniform. In running the tunnel at the dam site we encountered a temperature of 130°.

Mr. REEDER. In the tunnel?

Mr. NEWELL. Yes, sir.

Mr. REEDER. I thought it seemed quite cool when we went in there.

The CHAIRMAN. You have recently taken over some of the large diverting canals in the Salt River Valley that irrigate the land under the Roosevelt dam?

Mr. NEWELL. The principal canal in the valley, known as the "Arizona canal," has had a very unfortunate and checkered career. It finally went into bankruptcy, and, to cap the climax, the recent floods have destroyed the dam at the head of the canal, so that this large canal, controlling the north side of the Salt River Valley, is without water. The people of the valley were very urgent that something should be done to save them from ruin. After considerable discussion of the matter, the Secretary of the Interior agreed to buy the Arizona canal property—the canal dam, headworks, and everything except its real estate, at \$314,000. The contract was made recently, and we have been ordered by the Department to push the reconstruction of the diverting dam as rapidly as possible by force account in order to get it through, if possible, this fall. We have been making soundings for bed rock and will probably build the dam 2 miles below the site of the present headworks.

The CHAIRMAN. How expensive will that diversion dam be?

Mr. NEWELL. About \$300,000. It will be a concrete dam and will serve not merely for the north-side canal, but also for the south side.

Mr. KENNEDY. You expect to get that completed so that you can use it for the next season?

Mr. NEWELL. It depends on the summer floods.

The CHAIRMAN. In the meantime, what are the people going to do who have been served by that canal?

Mr. NEWELL. They are at work restoring the upper 2 miles of their canal and putting in a temporary brush and stone dam. If the water is high, they can probably get some into their canal, enough to save orchards; and if the water is low, by means of the little brush and stone dams they can get a little water. They are adopting every possible device to save the orchards during this season.

Mr. COOPER. It is almost a necessity to have something of this kind in order to save the orchards about Phoenix from total destruction?

Mr. NEWELL. Yes, sir. The canals to the south side of the river and the ditches in the vicinity of Phoenix are in use, but the larger

commercial interests are bound up in this canal which is now in a very bad condition.

Mr. KENNEDY. When this is completed, according to the plans, the lower canals will take the water from the Government reservoir?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. What advantage did you gain by the purchase of the high-line canal further than the benefit that comes from the united control?

Mr. NEWELL. That is a difficult question to answer. The original understanding was that the people would buy the canal through the Water Users' Association.

The CHAIRMAN. Had you not purchased it, it would have been necessary for the water users to have in some way provided for the maintenance of those canals?

Mr. NEWELL. Yes, sir. The first plan was that the water users would get enough money or offer to make the purchase from the Arizona Canal Company, but after considerable discussion this was found impracticable and it was determined that the Government should buy the canal.

The CHAIRMAN. That particular sort of an expenditure must necessarily be borne by the people directly served by that particular canal?

Mr. NEWELL. That is the understanding, that the people who are benefited by that particular canal, which involves the people on the north side of the river, should pay their equitable share of the canal. When it comes to the south side it may be necessary to build some new canal. The association is divided into districts with that object in view, viz, that each district shall pay its share of the benefits which that district alone receives, and the whole association shall pay an equitable share of the general expenses.

The CHAIRMAN. Do you expect to divert from this diversion dam you are proposing, on both sides?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. You are going to go 3 miles below the north side canal?

Mr. NEWELL. Yes, sir; 2 to 3 miles.

The CHAIRMAN. You raise your dam high enough so as to serve all the country originally served?

Mr. NEWELL. By a slight lowering of the bed of the old canal we can get the same effect and avoid 2 miles of bad country and still not lose any irrigable land.

Mr. KENNEDY. Do you know what amount of money the people you bought out had invested in that higher canal?

Mr. NEWELL. They claim to have invested \$1,500,000. I think their loss will aggregate over a million dollars. The stock and bonds were widely sold, in particular in Providence, R. I., Boston, Mass., and in Europe.

The CHAIRMAN. You are concentrating all your efforts in Arizona practically on the Salt River project for the present?

Mr. NEWELL. Yes, sir. The idea is to push that to completion as quickly as possible and begin to get returns.

The CHAIRMAN. The work in Arizona on the lower Colorado connected with the Yuma project is under Mr. Lippincott and is in a different engineering district?

Mr. NEWELL. Yes, sir.

Mr. COOPER. How many acres do you propose to irrigate in and around Phoenix by this Salt River project?

Mr. NEWELL. One hundred and sixty-thousand acres by gravity, and possibly 30,000 or 40,000 acres by pumping by the power developed at the Roosevelt dam.

Mr. COOPER. How much of this land is in private ownership and how much is public land?

Mr. NEWELL. It is practically all in private ownership. There is a large body of public land which can be served, but we have given the preference to the people already living in the valley. If they desire to take the water and to pay for it, we give them the preferential right over possible newcomers.

The CHAIRMAN. Is it your opinion that ultimately after 180,000 acres have been irrigated for a considerable length of time that the ground in the valley will become so saturated that probably a considerable further area can be irrigated by pumping?

Mr. NEWELL. Yes, sir. We believe a part of the water put on the surface will pass underground, and that by locating wells at suitable points with pumps connected with electrical power we can continue to extend the area of arable lands. It may be several thousand acres, or even tens of thousands of acres. That is a matter for the future to demonstrate.

The CHAIRMAN. The character of the Salt River below the Roosevelt dam is such that waterpower can be developed at various points?

Mr. NEWELL. Yes, sir; there are a number of points all along the river.

The CHAIRMAN. Does the Reclamation Service on behalf of the people it serves claim the right to control the river and its use for power below the dam?

Mr. NEWELL. Yes, sir. The public lands along the river on both sides have been withdrawn for the present pending the completion of plans. The storage dam at Roosevelt should be operated in the interest of irrigation and not of power development only. If a commercial power plant should obtain a vested right, the stored water might be sent down when it was not needed for irrigation. On the other hand the irrigation interest requires that water should be let out of the reservoir only as needed for irrigation. At such times the power is most needed for pumping.

The CHAIRMAN. From a legal standpoint your claim to the right to control the river below the dam and above your main diversion arises from the fact that the possibility of continuous power is an incident of the construction of the dam?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. And that being true, you claim the right to control the use of that water so stored for irrigation purposes?

Mr. NEWELL. We have two sources of control, one is the public ownership and control of the lands, and the other the control of the stored water.

The CHAIRMAN. Which alone could not effect the river for power purposes under the State laws unless you had some further claim?

Mr. NEWELL. Other interests could not get a place to locate works on the withdrawn lands.

The CHAIRMAN. That is, the Secretary might arbitrarily use his

power to prevent their doing that, but I imagine that he could not do that permanently. In some way mandamus would lie against the Secretary in any attempt he might make to arbitrarily withhold public lands for a legitimate purpose permitted by law, but, on the other hand, if your claim goes further than that, and the right to control the water gives you practically the power, it seems to me you are on a broader and more substantial footing.

Mr. NEWELL. We claim both through the control of land and the control of water.

The CHAIRMAN. The one is rather in the nature of an exercise of arbitrary power; the other would be in the line of a legal control, which could be defended in the courts, I imagine?

Mr. NEWELL. It is the same way if a water-power company should go in there and acquire all the lands so as to have control of the river. That is one of the important conditions now existing, namely, that the public lands along the rivers are being taken by water-power companies in order to control the rivers and avoid controversy with possible competitors.

Mr. COOPER. When this project is completed there will be 1,100,000 acre-feet of water?

Mr. NEWELL. Yes, sir.

Mr. COOPER. And the duty is between 4 and 4½ feet?

Mr. NEWELL. It varies largely on the crops, the number of crops in a season, and the soil conditions. In some cases the soil is quite open and sandy.

Mr. COOPER. What is the estimated duty of the water?

Mr. NEWELL. We have figured on an estimated duty of about 4 feet, of the stored water in the reservoir.

Mr. COOPER. Do you anticipate any trouble with the salt in the water; whether that will injure it for irrigation purposes?

Mr. NEWELL. There must always be very great care exercised in using this salty water. At low periods the river is quite salty; in flood the water is quite freshened. Our arrangements there are such that we will keep out of the reservoir the greater part of the salt.

The CHAIRMAN. Where does that salt come from—the upper reaches of the river?

Mr. NEWELL. Yes, sir.

Mr. COOPER. You have investigated and are satisfied with the results?

Mr. NEWELL. Yes, sir.

Mr. COOPER. There was a great deal of discussion about the salt?

Mr. NEWELL. Yes, sir. It is not unusual, however; salt and alkali occur in many parts of the West.

Mr. REEDER. What is the farm unit under this project?

Mr. NEWELL. We have not attempted to make any other than the 160 acres. The greater part of the land is owned in less than 40-acre tracts. There are a few large farms, but those must be subdivided. The average ownership is quite small.

Mr. REEDER. You have not made a unit at all, so there is no unit as to the Government land?

Mr. NEWELL. No, sir.

Mr. REEDER. Then, you will make a unit later?

Mr. NEWELL. Yes, sir. The tendency there is in the very small ownership—5 or 10 acre farms. The few large farms that would like

to come in have been held back until all the small owners could have the first chance.

Mr. REEDER. The larger ones to come in will have to come down to the 160-acre proposition?

Mr. NEWELL. Yes, sir.

Mr. COOPER. Through the establishing of these pumping plants you have tested considerably in that section?

Mr. NEWELL. We have made careful examination of the underground waters.

Mr. COOPER. I would like to ask whether you found the water salty or alkaline?

Mr. NEWELL. Great discretion must be used in establishing pumping stations.

The CHAIRMAN. Do you find that condition on the irrigated land?

Mr. NEWELL. Yes, sir; some very salty and some fresher than the river.

Mr. COOPER. What is the water level?

Mr. NEWELL. It lies at different depths, and the drilling of successful wells is frequently a matter of chance.

Mr. COOPER. There are no artesian wells?

Mr. NEWELL. There is only a small artesian flow.

CALIFORNIA PROJECTS.

Mr. NEWELL. There are two California projects. The work is under the charge of Mr. J. B. Lippincott, and consists of two large projects, one at the extreme south of the State, adjacent to Arizona—the Yuma project—and the other at the extreme northern end of the State, on the Oregon border. Both of these projects are interstate. The Yuma project depends upon the Laguna dam, built across the Colorado River about 12 miles above the town of Yuma. That is located at the lowest point on the river where there is solid rock on both sides of the stream. The drillings show no bed rock at moderate depths.

The CHAIRMAN. The probability is that you would have to go up the Colorado River a long distance, then, to find bed rock anywhere near the surface?

Mr. NEWELL. Yes, sir. We have explored the river for 400 miles without finding bed rock at least within a hundred feet below the surface.

The CHAIRMAN. That is not true when you reach the canyon proper?

Mr. NEWELL. So far as we have gone up the canyon we have not found any place where we could find bed rock within a hundred feet.

The CHAIRMAN. So the lower end of the canyon, deep as it now is, has at some time been still deeper?

Mr. NEWELL. Yes, sir; it has been necessary to modify the original plans for high-storage dams on Colorado River, and to put in a low dam with the two ends resting on solid rock. The dam is over 4,000 feet in length and very broad, the river passing over the entire crest of the dam.

The CHAIRMAN. What is the width of the dam up and down stream?

Mr. NEWELL. Two hundred and forty feet; that is the width up and down stream.

The CHAIRMAN. What is that built of?

Mr. NEWELL. It consists of three rows of concrete across the stream, with loose rock filled in between.

Mr. REEDER. How deep is that below the surface of the river?

Mr. NEWELL. It depends on the character of the material. In soft, sandy places 18 feet of piling are driven below the foundation of the concrete walls.

The CHAIRMAN. How far in that case would you go below the ordinary surface?

Mr. NEWELL. From 4 to 6 feet.

The CHAIRMAN. Just far enough to get below the shifting, moving sands?

Mr. NEWELL. Yes, sir; putting in a wide enough blanket of material so that the hydraulic head will not force the water under.

The CHAIRMAN. A dam of that construction would not carry a great head of water?

Mr. NEWELL. No, sir; about 12 feet of water is about the highest we expect to get, except in time of flood. The object of that dam is simply to raise the water and get enough head to keep the water moving in the ditches. The water is very muddy, and in order to keep it moving in the ditches it is necessary to get a sufficient velocity to prevent the mud depositing.

The CHAIRMAN. And in a short time you raise the river the height of your dam?

Mr. NEWELL. Yes, sir. Within a short time after the dam is completed the basin above will probably be filled with mud. At each end of the dam are large chambers or sluiceways. As the water passes through these the silt will drop and the clearer water then will be skimmed off into the canals. When the chambers are partially filled with material in the course of a few hours or days, the gates can be changed and the entire flood can be swept through the chambers cleaning out the mud.

The CHAIRMAN. You throw that back into the channel?

Mr. NEWELL. Yes, sir.

Mr. REEDER. How wide is that dam?

Mr. NEWELL. Two hundred and forty feet up and down and over 4,000 feet in length.

The CHAIRMAN. What slope do you give the faces?

Mr. NEWELL. The principal face has a slope of about two to one and the lower slope is twelve to one—that is, twelve horizontal to one vertical.

Mr. REEDER. The piling you drive, is it flat or logs?

Mr. NEWELL. That is a plank piling with tongue-and-groove joints. It is as nearly water-tight as possible.

The CHAIRMAN. Piling of that sort under the water will last a very great length of time?

Mr. NEWELL. Yes, sir; for a century, if it is kept under the water.

Mr. REEDER. Do you drive that piling 20 or 30 feet deep?

Mr. NEWELL. Where necessary; but where the foundation is stiff clay it is not necessary to put the piling in. It is put in only in soft places.

The CHAIRMAN. How much land will you probably be able to irrigate from that project?

Mr. NEWELL. Approximately 84,000 acres on the lowlands and 17,000 acres on the Yuma Indian Reservation, which is to be irri-

gated and thrown open. There is a possibility of pumping a portion of that water to the mesa above the town of Yuma, where some of the best land is located.

The CHAIRMAN. You have no means of developing power in connection with the project?

Mr. NEWELL. No, sir.

Mr. KENNEDY. What is the unit under that project?

Mr. NEWELL. It will be as small as we can make it, 40 acres; and if Congress would allow us to make it smaller we would make it smaller.

Mr. COOPER. Is it not claimed by the people there that by protecting the land the silt will fertilize it without anything further?

Mr. NEWELL. Yes, sir. The soil is now a hundred feet deep with this silt.

Mr. KENNEDY. Practically inexhaustible?

Mr. NEWELL. Yes, sir. Last winter, after we let a contract for a dike, in a single overflow the water came up and deposited 8 inches of material, thus saving the building of thousands of yards. It covered the country 8 inches with silt.

The CHAIRMAN. Where on the Colorado do you expect finally to be able to secure storage?

Mr. NEWELL. Ultimately the Colorado must be controlled by storage. The best storage site is the Kremmling reservoir site in Colorado. A railroad is now building through that area. Probably if that reservoir site is ever utilized, it will be necessary to move the railroad; as has been proposed in recent discussions.

Mr. REEDER. That has been done by Congress recently?

The CHAIRMAN. The claim was that the railroad had, before the passage of the irrigation bill, filed a right of way; that their right of way was prior.

Mr. NEWELL. The other reservoir sites are Browns Park, in Utah, and several sites on the headwaters in Wyoming. It is probable that enough storage can be procured in one way or another to control the stream.

Mr. REEDER. Will that have the effect to materially decrease the sediment that goes down the river?

Mr. NEWELL. Very materially. The amount of sediment is a function of the amount of water.

The CHAIRMAN. The ordinary flow of the river does not stir up the soil country sufficiently to bring up a very great amount of sediment?

Mr. NEWELL. No. It is the heavy storms that tear loose the material, and the waters carry it as far as they can and then deposit it until the next storm. In connection with the Yuma project there is a condition which has been discussed in the daily papers, and that is the fact that the Colorado River is now turning in Mexico to the west, going into the Salton depression or sink in the United States, and is gradually submerging valuable lands. The Southern Pacific is making strenuous efforts to get the river back into its old channel, but so far its efforts have not met with success. It is hoped they will, and they probably will succeed unless the flood this spring is worse than usual.

The CHAIRMAN. I met the secretary of the reorganized Imperial Valley Irrigation enterprise, who stated to me that they hoped now

if there were no unusual spring floods to be able to control the river. Do you think the situation there is still one of a good deal of uncertainty?

Mr. NEWELL. It is one we are all looking to with a great deal of anxiety and interest to see whether the works now planned will control the stream. The point of the break is in Mexico, at a point marked "Heading" on this little map.

The CHAIRMAN. Is there no possibility if it should prove impracticable to retain the river at the heading in its old channel to divert it lower down back toward the Gulf? There must be some water-course depression parallel with the old stream?

Mr. NEWELL. There are a number of places where dams have been suggested or attempted to divert part of the stream through Volcano Lake, or in a southerly direction.

The CHAIRMAN. That is in connection with the efforts now being made?

Mr. NEWELL. Yes, sir.

Mr. REEDER. The Laguna reservoir has nothing to do with the Yuma project?

Mr. NEWELL. The Laguna reservoir is the head of the canal system.

Mr. REEDER. And that is only 12 miles above?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. That Laguna reservoir will ultimately not be a reservoir, but a raising of the valley?

Mr. NEWELL. Yes, sir. The word "reservoir" should hardly be used in connection with the dam. The overflowed area above the Laguna dam will fill with sediment so rapidly that it will not hold much water.

The CHAIRMAN. Do you propose to fix the limit of that overflowed area above the dam by diking?

Mr. NEWELL. The topography settles that. The water overflows back to the foothills.

The CHAIRMAN. There will be no valuable land involved there?

Mr. NEWELL. No, sir; the only claims are the placer mines which are apt to be discovered wherever we do any work.

The CHAIRMAN. Your work has a tendency to stimulate mineral development?

Mr. NEWELL. Yes, sir; very decidedly. It increases the alleged value of the mineral lands.

Mr. COOPER. Does the breaking out of the Colorado River in any way interfere with your project at Yuma?

Mr. NEWELL. It does not directly, but a serious question has arisen as to the future. If the Colorado River continues to cut down its bed and that condition continues up above Yuma the progressive cut up to the Laguna dam might tend to lower the river bed at the dam and necessitate heavier and more expensive work in the dam itself.

The CHAIRMAN. How much of a lake or sea is there there now?

Mr. NEWELL. The sea is about 45 miles in length and 10 to 18 miles in width. We have recently had an excellent map made of it.

The CHAIRMAN. How deep is it?

Mr. NEWELL. It is 40 or 50 feet deep in the center.

The CHAIRMAN. I believe that depression is some 287 feet below the sea level.

Mr. NEWELL. Yes, sir; the original surface of the lake was 287 feet

below sea level. It has filled up now to about 250 feet below sea level.

The CHAIRMAN. So it is possible to have an inland sea there if this flow of water continues?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. Speaking of the level, do you refer to the surface of the lake or the bed of the lake?

Mr. NEWELL. The surface of the lake a few years ago was 287 feet below sea level. I do not think the depth has ever been ascertained.

Mr. KENNEDY. At the present time the surface of the lake is 250 feet below.

Mr. NEWELL. It is approximately that, it is coming up to the 250-foot line.

Mr. KENNEDY. Can you tell how long it has taken to rise 37 feet?

Mr. NEWELL. Yes, sir; we have accurate record. It began last June.

The CHAIRMAN. The break occurred in May—sometime about the middle of May?

Mr. NEWELL. Yes, sir; and the first perceptible raise was early in June. Then the water came up quite rapidly and encroached on the Southern Pacific tracks. They were moved back three times in succession out of the way of the water.

Mr. COOPER. Are any improved lands in that vicinity flooded now?

Mr. NEWELL. The water is beginning to reach up there. I do not think any improved lands have been flooded.

KLAMATH PROJECT—CALIFORNIA-OREGON.

Mr. NEWELL. The Klamath project, California-Oregon, is an interstate project on the border line of California and Oregon. The water from the Upper Klamath Lake in Oregon will be carried south to irrigate lands in California, and the waters from Clear Lake reservoir and other reservoirs in California at a high level will be carried north to irrigate lands in Oregon, the State line cutting the project in a very peculiar fashion. The first step is to build a canal from the Upper Klamath Lake to the nearest valleys, and at the same time to straighten the Lost River so that the waters will flow out to Klamath River and not back into Tule Lake.

Mr. REEDER. Will you carry it out to Klamath Lake?

Mr. NEWELL. Lost River will flow into the Klamath River above Keno, cutting out the Lower Klamath Lake entirely. The work on Lost River is intended to cut off the water which now flows at times of flood into Tule Lake and into Lower Klamath Lake, and permit them to dry up.

The CHAIRMAN. Does Clear Lake flow this way [indicating]?

Mr. NEWELL. It flows northerly and westerly and then after passing Bonanza and Olene it turns abruptly south and goes into Tule Lake.

The CHAIRMAN. Then your drainage from Klamath Falls is southwest?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. And your drainage from Clear Lake is northwest?

Mr. NEWELL. Yes, sir; the two finally uniting at Olene.

The CHAIRMAN. Then you drain Tule Lake?

Mr. NEWELL. It will dry up. The Lower Klamath Lake will also

be lower, the water flowing out toward Keno. A channel is planned for navigation through the middle of the Lower Klamath Lake. Tule Lake is lower than Klamath, and when Tule Lake dries up the water can be taken from the Upper Klamath Lake and put on those fields.

The CHAIRMAN. Your present idea is that you can largely reclaim the present bed of Tule Lake?

Mr. NEWELL. Yes, sir; and a considerable portion of Lower Klamath Lake.

The CHAIRMAN. Have you determined as to whether the major portion of the bed of Tule Lake is reclaimable? I saw in one of your reports or somewhere, a statement of the character of some of those lands.

Mr. NEWELL. We have studied that question. It will take several years to reclaim the Tule land. During the period of reclaiming the chief obstacle will be the danger of fire. It is proposed to reclaim the land very slowly.

The CHAIRMAN. It is peat?

Mr. NEWELL. Yes, sir; a thick bed of peaty material, which when thoroughly dry yields some of the best soil in the country. It will require very careful handling and very slow development so as to allow it to dry and decay.

The CHAIRMAN. They told us, I think, down there that the great danger with some of the reclaimed land on the lower Sacramento was that the land would burn up?

Mr. NEWELL. Yes, sir. Contracts were signed on February 2 and 5, 1906, for the construction of the canal near Klamath Falls. Work is now starting to build the main line canal south from Klamath Falls toward Merrill.

The CHAIRMAN. Where is Merrill?

Mr. NEWELL. North of Tule Lake.

The CHAIRMAN. Is that pretty good land that you cover with the first canal?

Mr. NEWELL. It is some of the best land in the valley. The idea is to take first the best and most easily accessible lands and to construct the project in such a way that it can be extended indefinitely and yet begin to yield a revenue almost from the start.

The CHAIRMAN. A branch of the main canal seems to run to Olene.

Mr. NEWELL. Yes, sir; up in Poe Valley, and can be conducted in that direction, but the greater part of the land to the east can be served from the Clear Lake reservoir to better advantage.

The CHAIRMAN. This is rather a complicated project, or is it more so in the seeming than in fact?

Mr. NEWELL. It is seemingly complicated to understand, but on the ground it is relatively simple. It enables an immediate development of a portion of California and Oregon and a continuous development through years by extending out from one valley to another. The principal matter to be borne in mind is that the first development should be of such a character as to permit of ultimate extension. We have therefore made far-reaching plans in the hope of building at once the main canal of the whole system and putting water on the ground this year or next spring and beginning to get returns, and then building branches in the different valleys.

The CHAIRMAN. The main canal from the Falls follows, as I understand it, the old Ankeny canal?

Mr. NEWELL. It hits into the Ankeny canal below Klamath Falls and continues in that direction.

The CHAIRMAN. In the region immediately east of the Lower Klamath Lake, how much public land is there?

Mr. NEWELL. There is relatively little public land along the first line.

The CHAIRMAN. That is largely in private ownership?

Mr. NEWELL. Yes, sir. The principal public land will lie in Poe Valley and Langells Valley, the central part of the country having been pretty well taken up. With the drying up of the lower Klamath Lake and Tule Lake there will be a large area of land made available for settlement. By the action of Oregon and California that land is put at the disposal of the United States.

The CHAIRMAN. I notice that you have traced a high pumping line from the main canal line immediately below Klamath Falls?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. Do you develop power in the ditch near its head?

Mr. NEWELL. At the outlet of Klamath Lake there is considerable fall available for power, and also at other places, notably on some of the lines coming from Clear Lake reservoir into California. The largest power can be developed below Keno where the Klamath River begins its rapid descent toward the ocean.

The CHAIRMAN. There is an opportunity there for the development of considerable power?

Mr. NEWELL. Yes, sir. There are large opportunities all through that valley. Power can be utilized for raising the water up to a higher level than can be covered by gravity.

The CHAIRMAN. How far have you gotten along with the construction? Are the contracts let?

Mr. NEWELL. The contracts are let for the main line canal.

The CHAIRMAN. As far as Merrill?

Mr. NEWELL. Not quite as far as Merrill, but down through the upper part of the valley, with the intent to cross the valley and come down on the west side toward Merrill. The main contract involves the headworks tunnel and the larger work in the vicinity of Klamath Falls.

The CHAIRMAN. You say you also contemplate immediate work on the main Lost River canal, the outlet to Clear Lake?

Mr. NEWELL. The straightening of Lost River is one of the first works. As soon as the principal contract is well under way, we can take up the straightening of Lost River.

The CHAIRMAN. In order that you may take up the work of diversion from Lost River to irrigate Langells Valley and that region?

Mr. NEWELL. Yes.

Mr. REEDER. What about this marsh up near the upper Klamath?

Mr. NEWELL. That is on the Klamath Indian Reservation, and it is not thought desirable at present to draw down the upper Klamath Lake to drain that marsh.

The CHAIRMAN. Are there any more inquiries which members of the committee desire to make in regard to this project?

Mr. REEDER. All of this water from Klamath Lake finally goes out by Keno to the ocean?

Mr. NEWELL. Yes, sir.

Mr. REEDER. This entire country drains that way?

Mr. NEWELL. Yes, sir; and with rapid fall the water passes out toward the Pacific Ocean.

Mr. REEDER. That is the Klamath River that passes Keno?

Mr. NEWELL. Yes.

Mr. REEDER. I see it is marked here. Here is lower Klamath Lake. I have never been up there to that lake.

The CHAIRMAN. If there is nothing more of special interest in that project, we will go to the next.

Mr. NEWELL. The next State in alphabetic order is the work in Colorado and Utah on the chart. Mr. J. H. Quinton is in charge of

COLORADO AND UTAH PROJECTS.

The principal work in this district consists of tunnels, the largest of which is on the Gunnison River, taking water from the Gunnison River into the Uncompahgre Valley to supplement the water supply in that valley. This tunnel is upward of 30,000 feet in length and is approximately 12 feet wide, 12 feet high, and is to be lined throughout with cement. The work was originally let to the Taylor-Moore Construction Company. Upon the failure of that company in May, 1905, the Secretary of the Interior took possession of their works and proceeded to carry on the work and readvertise for new bids. The bids received were not considered favorable by the board of engineers and were rejected, and the work is now being carried on by the Secretary under the Taylor-Moore Company's contract, defaulted, and is proceeding at a rapid rate.

On the Gunnison River end the work is in solid granite, and on the Uncompahgre end it is in shale and soft material.

The CHAIRMAN. What is the length of that tunnel?

Mr. NEWELL. About 30,000 feet.

The CHAIRMAN. A little less than 6 miles.

Mr. NEWELL. Of which 9,965 feet have been driven.

The CHAIRMAN. When do you hope to complete the tunnel so as to let water through?

Mr. NEWELL. It will be through, we hope, in 1908. It depends largely on the character of the materials which we find.

The CHAIRMAN. Do you mean that you will be able to complete it by the spring of 1908, so that you can take water through it?

Mr. NEWELL. Hardly by spring, but we hope during that year to get water through it. One of the questions will be our ability to obtain cement. We are having great difficulty in obtaining cement now. The price has been advanced from 30 to 60 per cent.

The CHAIRMAN. Is that due to the large amount of the public work going on?

Mr. NEWELL. The large amount of public and railroad construction.

Mr. REEDER. All the buildings in those towns which are growing so rapidly in Kansas are being built up of cement. All our houses are of cement. Every town has one or two cement-block plants, manufacturing building blocks.

Mr. NEWELL. This year has seen the most marvelous increase in the cement industry. The prices are very high, and the manufacturers are quite independent, so that we may be delayed by the difficulty of getting enough cement into Uncompahgre Valley to line the tunnel quickly; but we are now working there four headings. We hope to knock out the plug between headings three and four this next

month, and then begin lining the lower end while driving headings one and two.

The CHAIRMAN. What is the distance between headings three and four?

Mr. NEWELL. It is now about 300 feet.

The CHAIRMAN. My question was, what is the length of tunnel between those two headings?

Mr. NEWELL. About 1 mile from the lower portal of the tunnel to the shaft. We are very nearly through with that part. The tunnel is supported throughout by timbers in the soft portion, and the timbers will be left embedded in cement.

The CHAIRMAN. The capacity of that tunnel is how many cubic feet per second?

Mr. NEWELL. It is about 1,200 cubic feet per second. It will carry the entire low-water flow of the Gunnison River.

The CHAIRMAN. How much land which was public land at the time this project was undertaken will you irrigate from this tunnel?

Mr. NEWELL. The land which was subject to the reclamation act is between 30 and 40 per cent of the entire area. Practically all of the land in private ownership has been subscribed, and most of that is in small holdings. I think there are about 2,000 small owners in the valley who have become members of the Water-Users' Association.

The CHAIRMAN. You feel very hopeful of a successful outcome of the Uncompahgre project?

Mr. NEWELL. Yes.

The CHAIRMAN. And of the ability of the settlers to pay the price?

Mr. NEWELL. I think so. The lands are very valuable. It is an excellent fruit country, and so far the prices are high and the people are extremely optimistic.

The CHAIRMAN. The water from the Gunnison River is quite free from alkali, as I understand?

Mr. NEWELL. Yes, sir; it is good water. That work has extended to the point where the tunnel is being driven rapidly. From the lower portal of the tunnel the south canal has been nearly completed to the Uncompahgre River. The canal is mostly an open side hill cut, but passes through a few tunnels. It will discharge into the Uncompahgre River south of Montrose, and the water can then be taken out on the west side by high-line canals or taken out lower down in the existing canal system.

The CHAIRMAN. This proposed west canal is considerably above all present canals, is it?

Mr. NEWELL. It is above everything at present.

The CHAIRMAN. You have done no work on that proposed west canal?

Mr. NEWELL. No; not on the west side.

The CHAIRMAN. Have you determined whether or not you will use that or use the Delta canal?

Mr. NEWELL. It is a question largely of making terms with the Delta people. We can build a high-line west-side canal, and it is a matter which we are leaving largely to the Water Users' Association to determine just how these things should be worked out.

The CHAIRMAN. You do get a little additional land under your high-line canal; but I notice that it looks pretty rough?

Mr. NEWELL. We get additional land, but it is a question whether

the cost will justify building it. That is one of the problems which is being slowly worked out by the people themselves.

The CHAIRMAN. Your east-side high-line canal will probably be constructed?

Mr. NEWELL. Yes.

The CHAIRMAN. Or is that also a problem, as yet?

Mr. NEWELL. There are a number of problems there. On the east side through the adobe hills it is a question whether it will pay to put in the high-line canal or whether it will be better to adopt some of the lower lines of canal. The people are now discussing it pro and con, trying to make up their own minds as to which they had rather do. We have rather left it to them to determine what they will do and what they will pay for the present existing canals, believing that their solution of the problem will be satisfactory to them. This work is moving on well and continuously.

The CHAIRMAN. Now, the canal work which you are doing there is under contract, is it?

Mr. NEWELL. Yes, sir. That has nearly been completed in a series of contracts.

The CHAIRMAN. Have any members of the committee any questions to ask on this?

Mr. COOPER. How many acres will be reclaimed?

Mr. NEWELL. About 80,000 acres have been subscribed, and there are in addition some of the high-line lands which can be brought under if it is desirable to do so.

The next in order is the Strawberry Valley project in Utah.

UTAH—STRAWBERRY VALLEY PROJECT.

This project is for the building of a reservoir on the headwaters of the Duchesne River, which flows into the Green River, and that into the Colorado River, taking the water from that reservoir through a tunnel which extends to the crest of the Uinta Mountains and delivering the water on the west side into the headwaters of the Spanish Fork, which flows ultimately into Utah Lake.

The land to be served is in the vicinity of Spanish Fork and Payson, and is all in private ownership in small tracts. There are upward of a thousand small owners who are interested in this project. The agreement is at upward of \$25 an acre-foot of water, which would practically be about \$50 an acre for enough water to keep them through the season.

The CHAIRMAN. What stream is that diversion from?

Mr. NEWELL. The headwaters of the Duchesne, known as Strawberry Creek.

The CHAIRMAN. Do you contemplate any storage?

Mr. NEWELL. A small storage at the outlet of the Strawberry Valley, and a diversion by a tunnel. This tunnel line has been laid out, and the plans and specifications have been prepared. We have been instructed to hold up this project for the present while certain questions pertaining to water for the Indians on the Uintah Reservation can be settled. The work is in shape so that we can take it up immediately when authority is given.

The CHAIRMAN. The land that you would irrigate is to a very considerable extent now under irrigation, is it?

Mr. NEWELL. It is under partial irrigation from the little streams on that side of the mountain.

The CHAIRMAN. Would your canals reach a higher line?

Mr. NEWELL. They would reach a higher line, and would economize the water, taking it out in one large conduit, and would permit a more equitable apportionment, so that it would facilitate a cultivation of all the land rather than a partial cultivation in some seasons. The value of water is appreciated there more than anywhere else in that altitude and latitude. It is a sugar-beet country, with excellent markets, with two lines of railroad in it.

The CHAIRMAN. The beet-sugar factory is at Provo, is it not?

Mr. NEWELL. I think there is one at Provo and one at Lehi.

The CHAIRMAN. Now, the country that we saw as we went down from Provo, as I understand it, is the country that would come under this project.

Mr. NEWELL. There is nothing notable about this project except the tunnel which is under the charge of Mr. Quinton, who has charge of the Uncompahgre Valley.

The CHAIRMAN. How long will that tunnel be?

Mr. NEWELL. About 6,000 feet. Mr. Quinton has built over 70 tunnels of this character, and is thoroughly equipped to carry on that work.

IDAHO PROJECTS.

Mr. REEDER. Here is one that I am considerably interested in. I was surprised at the improvement those people are making there.

Mr. NEWELL. Taking up the next in order we come to the Minidoka and the Payette-Boise, farther east, on the junction of the two rivers, the Payette and the Boise. The Minidoka project is one which involves public lands entirely. A dam is being built across the Snake River to take water out on both sides, mainly on the north, and irrigate a large extent of sagebrush-covered land through which the Oregon Short Line has built a railroad down to Twin Falls. On that railroad we have laid out three town sites, and on these town sites people are living and anxiously waiting the coming of water to the land. The ditches are nearly complete, and we are hoping to get water on some of their land this summer.

The CHAIRMAN. That bill, which has been referred to here, and which our friend Mr. Kennedy has been particularly interested in—that bill which allows those now settled upon the town sites to buy their lots at an appraised price—refers to the towns of Heyburn and Rupert?

Mr. NEWELL. Yes.

The CHAIRMAN. Where is Rupert?

Mr. NEWELL. That is the middle town site.

The CHAIRMAN. As shown on this map?

Mr. NEWELL. Yes.

The CHAIRMAN. What do you call the lower one, or is not that named?

Mr. NEWELL. Scherrer. The development is proceeding with great rapidity, and there is no question as to the financial success of the people on that land.

The subdivision of farm units of 40 and 80 acres have been taken up rapidly, and relinquishments have sold all the way up to \$1,500 for a 40-acre tract.

The CHAIRMAN. That is in the vicinity of the town?

Mr. NEWELL. In the vicinity of the town of Heyburn. Relinquishments have sold for that for a 40-acre tract. There is a veritable land boom.

The CHAIRMAN. That is unfortunate, is it not, in a way?

Mr. NEWELL. It is.

The CHAIRMAN. When people spend that much money for a relinquishment in some cases, I suppose, it leaves them in such financial condition that they will find it difficult to meet the Government payments?

Mr. NEWELL. The people who are coming in there are relatively well off. Some are coming from the irrigated sections of the country, and there is an active demand for this land. It is an exceptionally good, level country. In every direction the settlers are breaking up the ground.

The CHAIRMAN. They are cleaning that land off now?

Mr. NEWELL. Yes.

The CHAIRMAN. So that when you reach that land with water there is a good deal of it that will be cleared of sagebrush?

Mr. NEWELL. Yes. The land is being broken up, and crops will be planted in the hopes of getting a little rain or in the hopes of getting a little water to it. One of the contractors is far behind in his work, and it may be necessary for us to take it up.

The CHAIRMAN. That is not the contractor on the dam?

Mr. NEWELL. No, sir; it is on a portion of the main-line canal.

The CHAIRMAN. But every effort will be made to get water on during this summer?

Mr. NEWELL. During this season; yes.

The CHAIRMAN. You will get some water through your main north-side canal?

Mr. NEWELL. We hope to this season.

The CHAIRMAN. You hope to be prepared at least to furnish the lands under the main north-side canal during the coming year?

Mr. NEWELL. Yes, sir. Wells have been put down in many places, and people are living on the land.

The CHAIRMAN. They do find water at a reasonable depth?

Mr. NEWELL. Yes, sir; we put down wells at each town site, and the water is good.

The CHAIRMAN. It is fairly good water?

Mr. NEWELL. Yes, sir; fairly good water, and many windmills are going up throughout the tract.

The CHAIRMAN. Are you doing anything with the south-side canal so far?

Mr. NEWELL. That is nearly finished to the point shown on the map.

The CHAIRMAN. That is, to the margin of the map?

Mr. NEWELL. Yes, sir; to the margin of the map. There is a large tract of land which lies above the canal, and to which ultimately we hope to take water by pumping. There are many homestead entries on that portion of the tract above the canal, and many settlers have come in, and they are importuning the Secretary of the Interior to hasten the building of the pumping plant. They have been informed that in settling on that land it is done at their own risk. The pumping plant will probably not be built until the success of the

gravity system has been demonstrated, and some of the amount of money invested has begun to come back.

The CHAIRMAN. There has been a good deal of criticism of the service in regard to that pumping plant on the north side.

Mr. NEWELL. The south side.

The CHAIRMAN. On the south side. A newspaper published at Burley, which comes to all the members of the committee, I presume, I know it does to me, contains a great many seemingly rather extravagant statements.

Mr. COOPER. It is my recollection that Burley is on one side of the river and Heyburn is on the other.

Mr. NEWELL. That is so.

The CHAIRMAN. Is that under the pumping?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. This canal would not swing out here, as it would seem to?

Mr. NEWELL. No, sir.

The CHAIRMAN. Those people claim to have had all sorts of promises in regard to the early building of that pumping plant.

Mr. NEWELL. So far as I am aware they have had no promise from any officer of the Government. The original plans made were such that the pumping plant may be installed. Every structure has been built with a view to ultimately installing pumping devices, but the statements made have always been, so far as I am aware, that the pumping plant would not be built until after the gravity system was completed, and that there was no probability of water being put on the land above the gravity canals for a number of years.

Nevertheless, I believe that representations to the contrary have been made through the newspapers by irresponsible parties with the hope of increasing the value of relinquishments. Many innocent people have been misled. It is an unfortunate condition, but is one that prevails on most reclamation projects. There is not enough land for everyone, and people will take up land on the outskirts beyond or above the ditches and to which water can not be brought. These people then use every argument that can be brought to bear for the inclusion of their lands in some way or another.

The CHAIRMAN. The claim has been made that at one time there was a sufficient amount of money apportioned to this project to complete it, including the pumping plant, and that a portion of that was afterwards diverted to the Payette-Boise project.

Mr. NEWELL. The original estimates made were for \$2,600,000. At a later time the Secretary set aside \$1,300,000 for Payette-Boise. It was considered wiser not to experiment on the pumping until the gravity system was finished and the conditions which we knew would succeed had been thoroughly demonstrated.

The CHAIRMAN. Do your headworks at Minidoka, or will your headworks at Minidoka, make possible the development of a considerable amount of water power?

Mr. NEWELL. Yes.

The CHAIRMAN. Throughout the season?

Mr. NEWELL. That will make possible the development of a large amount of power for the reason that there must pass our headworks, for the use of the Twin Falls project, about 2,000 feet per second.

That makes possible the development of power throughout the irrigating season.

The CHAIRMAN. And that will pass your dam with a sufficient head so that you can utilize it for power?

Mr. NEWELL. Yes; so that we can utilize it for power.

The CHAIRMAN. That really will give you a very considerable amount of power for pumping or other purposes?

Mr. NEWELL. Yes, sir. While we have made plans for pumping, we have hesitated to actually install the pumping stations until the conditions were actually demonstrated that the whole was a success.

The CHAIRMAN. You feel very hopeful about the outcome of this Minidoka project?

Mr. NEWELL. I think it will be one of the most successful in the country. The land and the climate, and the enthusiasm of the people who have gone in there and the excellent character of the settlers, are such that I believe the pumping project should be taken up just as soon as any returns begin to come in from the gravity works.

The CHAIRMAN. As a matter of fact, the sale of relinquishments, further than the fact that it gives people who are probably not entitled to it considerable sums of money for a right which they have obtained, is a hopeful indication in that it means that people of means are going in?

Mr. NEWELL. Yes.

The CHAIRMAN. People who have money enough to put in relinquishments, I assume have some considerable resources in addition to that?

Mr. NEWELL. Yes. As a rule they are people who have had experience in irrigation and know what it means, and in order to select a desirable tract at their leisure they are willing to pay a bonus to some man who has got in ahead.

The CHAIRMAN. Before we conclude the hearing I should like, as a general statement of the proposition, to make a few inquiries as to the general character of the people who are going onto the projects in the first instance. I think perhaps you had better make that statement after you get through with this.

PAYETTE-BOISE.

Mr. NEWELL. The other project in Idaho, the Payette-Boise, is also a very excellent project, and one that is meeting with great success. It contemplates the diverting, ultimately, of a part of the water of the Payette, where there is water in excess, and the bringing of that water into the Boise Valley, where there is more land than water. The first step in this work has been to provide storage on the lower end of the Boise River by taking out some of the floods, through a canal already constructed, into a depression known as the Deer Flat, near the town of Nampa. This depression is occupied now in part by a few excellent farms, some of them valuable, but the land is more valuable for storage of water than for farms. We are purchasing that land with the idea of flooding it and then taking the water out around the towns of Nampa and Caldwell and other towns down toward Snake River.

The CHAIRMAN. What river do you take out of?

Mr. NEWELL. Out of the Boise River, above the city of Boise, and carry it westerly above Nampa and drop it into the Deer Flat. Contracts have been let for the reservoir and the canal toward it.

The CHAIRMAN. Do you use the Ridenbaugh canal for that purpose?

Mr. NEWELL. We could use either the Ridenbaugh or New York canal, but satisfactory arrangements have been made with the New York canal.

The CHAIRMAN. What construction is necessary to make the Deer Flat available as a reservoir?

Mr. NEWELL. It is necessary to close it with several low dykes, and one very high dirt dyke.

The CHAIRMAN. These are all earth dykes?

Mr. NEWELL. Earth dykes. We have let contracts for everything excepting one of the large earth dykes, and there we could not secure reasonable bids. The Secretary of the Interior ordered us to proceed to build this at once.

The CHAIRMAN. That requires larger machinery?

Mr. NEWELL. Yes, sir; that necessitates larger machinery.

The CHAIRMAN. How long ago did you advertise for bids on that?

Mr. NEWELL. From December 28, 1905, to February 1, 1906, when the bids were opened. The contracts for part of the work were awarded on February 14, 1906.

The CHAIRMAN. Did you receive no bids at all on that larger work?

Mr. NEWELL. We received three bids, but they were so excessive and the conditions were so extreme that we recommended their rejection, and the purchase of shovels and putting in the heavy earth work ourselves.

The CHAIRMAN. That will necessitate the purchase of a good deal of heavy machinery by the Government?

Mr. NEWELL. Yes.

Mr. REEDER. When we were at that project they were boring there to discover what the soil was below. What was the object in doing that if there was to be a dirt dam?

Mr. NEWELL. To ascertain the probable amount of percolation beneath the dam. The stability of an earth dam depends on cutting off the percolation underneath the earthwork.

Mr. REEDER. Did you find in this case that it was necessary for you to drop a core a considerable distance?

Mr. NEWELL. Yes; in some cases it was necessary to put in sheet piling and a core. By making the base of the dam wide enough and putting in sheet piling the underflow is reduced to an amount so small that it is practically negligible.

Mr. REEDER. Because it will gradually fill up and there will be less leakage if it is clear.

Mr. NEWELL. Yes; the work there is proceeding very satisfactorily in cooperation with the water users' association. Most of the land purchases have been made through the officers or the agents of the water users' association, so that they are satisfied that the prices are fair and just.

The CHAIRMAN. The use of the Deer Creek Flat as a reservoir and irrigation therefrom is only one feature in this Payette-Boise project?

Mr. NEWELL. That is one link of it. The general project is like others, capable of development to cover a very large area, but we will begin to get returns very soon, and extensions can be made as funds are available.

The CHAIRMAN. So far you have not done work in the construction of the canal leading to the Deer Flat reservoir?

Mr. NEWELL. Contracts have been let for the canal from Indian Creek to Deer Flat reservoir and for the enlargement of the New York canal.

The CHAIRMAN. I see.

Mr. NEWELL. And the improvement of it near its head.

The CHAIRMAN. You have, then, made arrangements to use the New York canal as your diversion canal?

Mr. NEWELL. Yes.

The CHAIRMAN. And distributing canal?

Mr. NEWELL. Yes.

The CHAIRMAN. Do you take the ownership of that canal there?

Mr. NEWELL. No, sir; we take the right of way.

The CHAIRMAN. Do you then in any way interfere with the present distribution of water from that canal above the Deer Creek Flat?

Mr. NEWELL. No, sir; the water rights there are extremely complicated. A suit has been recently decided for the adjudication of a great many claims to the water of Boise River. We do not interfere with the present rights, but we take the flood waters in excess of the present adjudicated rights, carrying them through one of the existing canals by enlargement of it without interfering with their proper use.

The CHAIRMAN. At the present time, then, you do not contemplate having anything to do with the irrigation under these various canals, the settlers' canal, the Ridenbaugh, the New York, and others above and in the vicinity of Nampa?

Mr. NEWELL. These are matters which the water users' associations are adjusting. Ultimately it is hoped that the whole distributing system will be brought into one uniform organization under the Water Users' Association. At present there are a great many minor organizations whose rights have been carefully defined, and which will ultimately get together in the larger body, so that through the influence of the Government work there should be an adjustment of all the complicated rights of that valley through providing an additional supply by storage.

The CHAIRMAN. What is the storage capacity of that Deer Creek reservoir?

Mr. NEWELL. It is about 186,000 acre-feet.

The CHAIRMAN. Will you irrigate any Government land or any land that was Government land?

Mr. NEWELL. A small amount of it, but preference being given to the lands in private ownership the probability is that much of the water made available will be used on private lands.

The CHAIRMAN. As I understand you, then, this is a case in which the Government work in the storage of the waters of the Boise in the Deer Creek reservoir, and its use below, will probably lead, through the Water Users' Association that has been formed, to a general consolidation of water rights on the south side of the Boise River?

Mr. NEWELL. Yes; on the Boise.

The CHAIRMAN. Are you taking anything on the Payette under this?

Mr. NEWELL. Not at this time, but the plans are being made so that it will all go in together as one.

The CHAIRMAN. You call this the Payette-Boise?

Mr. NEWELL. Yes.

The CHAIRMAN. But so far you have taken up no work on the Payette?

Mr. NEWELL. No; not as yet.

The CHAIRMAN. If you did, what would be the character of the work on the Payette?

Mr. NEWELL. It would be the building of a dam above Emmett and bringing out the excess water on the south side of the Payette River, and possibly through a tunnel into the Boise Valley, covering a large extent of public land between the Payette and Boise.

The CHAIRMAN. Is the Payette a stream that would furnish a considerable amount of storage water?

Mr. NEWELL. Yes; there is more water there than can be used in its own watershed.

The CHAIRMAN. Are there available sites?

Mr. NEWELL. Yes; there are excellent storage sites near the head.

The CHAIRMAN. Toward the head of the stream?

Mr. NEWELL. Yes.

The CHAIRMAN. What has been set aside for that project?

Mr. NEWELL. One million three hundred thousand dollars. With these projects the amount set aside for the first unit is considerably less than will be needed for their first development. As shown in the table exhibited a few days ago there are great opportunities for extension of each of these projects. There will be great demands for additional work, and it is a matter of public policy which will be determined by the proper persons as to how much these present projects may be extended, or how much shall be done with new projects. We have not only these primary projects which may take many million dollars, but we have also the secondary projects which will take many millions more, so that the money in sight, while adequate to finish certain projects, or portions of projects, will not finish all which we are discussing.

PROJECTS IN KANSAS.

If that covers Idaho, the next in order would be Kansas, where we have what may be called an experiment; the pumping of water from underground at Garden City, on the Arkansas River. The country in this vicinity has been covered by a large irrigation system in the past, but this has fallen into disuse, owing to the uncertainty of getting water directly from the river. Arrangements have been made with one of the canals by which the owners of the canal and the owners of land under it agree to pay for the water which may be pumped from the low-lying lands along the river.

The CHAIRMAN. The present canals are gravity canals?

Mr. NEWELL. They are all gravity canals.

Mr. REEDER. What height do you raise the water?

Mr. NEWELL. About 20 feet.

The CHAIRMAN. Why the necessity for pumping; because there is no opportunity for storage on the surface?

Mr. NEWELL. There is no opportunity for storage, and the water supply of the river is very uncertain.

The CHAIRMAN. And therefore a gravity system without storage is not feasible?

Mr. NEWELL. Not feasible; no, sir. In fact, there is no way that has been demonstrated yet of getting water to this area systematically and certainly without pumping from the underground flow.

The CHAIRMAN. What opportunity is there farther west on the Arkansas River for storage?

Mr. NEWELL. Farther west on the Arkansas River storage has been taken up. There are basins out on the plains that have been utilized, and there are others up in the high mountains; but the claims to water on the Arkansas River so far exceed the supply that it is questionable whether any storage can be undertaken by the Government without interfering with present plans. So that the only way it seemed possible to get water for western Kansas was to pump it from beneath the surface. The geologic structure is such that there is a large amount of water in the gravels beneath the surface. That water is moving at the rate of a few feet a day, not along the present river channel, but rather diagonal to it. It has been demonstrated that that water can be pumped to the surface without notably diminishing the apparent supply.

Mr. REEDER. What per cent of that water goes to waste in floods?

Mr. NEWELL. Probably from 50 to 75 per cent of the entire flow comes down in floods and is wasted.

Mr. REEDER. That can not be utilized at all by building reservoirs?

Mr. NEWELL. No, sir.

The CHAIRMAN. During what time is that?

Mr. NEWELL. The duration of the floods is so short that it is almost impossible to get the water out and into reservoirs.

Mr. COOPER. How many acres will there be when this Garden City project is completed?

Mr. NEWELL. Eight thousand acres have been subscribed.

The CHAIRMAN. Did you say that they had abandoned their farms there at Garden City?

Mr. NEWELL. No, sir; the irrigation system has been abandoned in part, not entirely. This year there is a boom in western Kansas, and the old ditches have been cleaned out with the expectation of getting some water. Some of the newcomers do not know anything about irrigation, unfortunately. The building of a sugar factory at Garden City has brought in a great many new people.

The CHAIRMAN. There is a sugar factory there?

Mr. NEWELL. Yes, sir; under construction now. We have advertised for bids for a pumping plant and given the option of either a reciprocating pumping engine, or a steam turbine, which is coming into large use, or the gas producer, so that the manufacturers of the three types of motive power—the reciprocating steam engines, the rotary turbines, and the gas producers—would compete on producing a certain amount of power.

Mr. REEDER. When will you have those bids?

Mr. NEWELL. They will be opened next month.

The CHAIRMAN. How great will your lift be there?

Mr. NEWELL. The lift will approximate about 20 feet. It depends on the extent to which we draw underground water.

The CHAIRMAN. To what extent will the wells go?

Mr. NEWELL. They will be about 6 inches in diameter, and will be strung out for a distance of from 2 to 5 miles. We will put in a part of the wells at first, and see how that affects the ground water.

The CHAIRMAN. You will have one single line stretching across the valley?

Mr. NEWELL. Yes.

The CHAIRMAN. How near together?

Mr. NEWELL. The wells will be in groups of three or five wells connected together. Over this group, or the central well, will be built a little house, and in that house will be installed a motor and pump, so that the whole device, rigidly set on one frame, will be free from vibration, and the power transmitted to this little power station will be connected in such a way that a man going along from one group to another can start the pumps.

The CHAIRMAN. You do not propose attempting to develop this so-called gallery system that was utilized somewhat at one time?

Mr. NEWELL. No, sir; the so-called underflow gallery or drainage system has been experimented with and a great deal of money has been spent in it, but, so far as I can find, in no case successfully. It simply consists of putting a drain through the country, and in that drain the flow at first is large, and then drops off until there is only a small percolation; but the well does not go all the time, while the drain acts continuously. Practical experience has shown that the same amount of money invested in a system of wells is far more likely to succeed than when invested in this draining device. The water is just as apt to run out of the drain sideways as to run into it. There is no reason for its going one way more than another.

The CHAIRMAN. These are bored wells, are they?

Mr. NEWELL. Yes; arranged in groups, according to our exploration of the ground where they will probably get the best supply of water. The construction will be taken up, we hope, immediately—during this coming spring.

The CHAIRMAN. What do you estimate the cost of that plant to be?

Mr. NEWELL. The plant will cost about \$250,000.

The CHAIRMAN. The present system of ditches will furnish the necessary distribution, will it?

Mr. NEWELL. Yes; the ditches are already in. It is simply a matter of pumping into the head of one of the ditches.

At 1 o'clock p. m. the committee adjourned until Thursday, April 26, 1906, at 10.30 o'clock a. m.

COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Thursday, April 26, 1906.

The committee met at 11 o'clock a. m., Hon. Frank W. Mondell, chairman, in the chair.

The CHAIRMAN. Mr. Henny, supervising engineer for Washington and Oregon, is here, and it is your wish, as I understand, Mr. Newell,

that we hear Mr. Henny this morning in regard to the work of those States?

Mr. NEWELL. Yes, Mr. Chairman.

The CHAIRMAN. We will be very glad to hear from Mr. Henny.

STATEMENT OF MR. D. C. HENNY.

Mr. HENNY. Gentlemen, since I came to take charge of these two States, about a year ago, we have completed the preliminary work on the various projects which were then under investigation. In the State of Washington the Okanogan project in the extreme north and the Yakima project in the Yakima Valley, and in the State of Oregon the Malheur and Owyhee projects in the extreme eastern portion, and the Umatilla project in the northern portion of Oregon. As a result of this investigation, board meetings were held during last fall in October, and as a result of those board meetings recommendations were made favoring the construction of the Okanogan project, and requesting that half a million dollars be set aside for its construction.

Recommendations were made favoring the construction of the Tieton project, which is a subproject in the general Yakima development as contemplated, and also favoring the construction of the Sunnyside project, which involves in connection with it the purchase of the canal of the Washington Irrigation Company, the so-called Sunnyside Canal. So far as Oregon is concerned, the board favored the temporary abandonment of the Malheur and Owyhee projects and the construction of the Umatilla project. As a result, early in December the Secretary of the Interior approved these recommendations, attaching to his approval, however, certain conditions as to what the people under these various projects would have to do, and in the case of the Yakima what the people in the entire valley would have to do before he would give his final approval.

Early in February I reported on the extent to which the conditions imposed by the Secretary had been complied with, and so far as the Yakima project is concerned I understand that the final approval of the Secretary has been given. As far as the Okanogan project is concerned I am not entirely advised. The approval of the Secretary was conditional, and there were certain conditions in the recommendations of the engineers.

The CHAIRMAN. When you speak of the Yakima project, do you have reference to the development of the Yakima River?

Mr. HENNY. No, sir. I am pleased that you should give me a chance to correct that. I should say the Tieton subproject of the entire Yakima project and also the Sunnyside subproject. For the former the Secretary set aside \$1,000,000, and for the latter \$750,000. The conditions that the Secretary imposed on the Yakima Valley were met, and he gave his final approval to the subprojects.

The CHAIRMAN. What were those conditions—the settlement of the question of water rights?

Mr. HENNY. Yes, sir; that was the principal condition and the hardest to meet. There were some others, as to the pledging of lands under the different projects, so as to insure the return of the money.

The Okanogan project, as I stated, did not have any conditions attached in the approval of the Secretary, but there were some con-

ditions implied by reason of his approval of the recommendations of the engineers who did make conditions. I therefore reported upon the conditions as they had been set forth in the recommendations of the engineers, saying that it was my opinion that these conditions had been satisfactorily complied with.

I also reported upon the same matter in connection with the Umatilla project, saying that in my opinion the conditions had been satisfactorily met. We have spent the winter in making preparations for specifications and detailed plans for the Okanogan and the Umatilla projects, and partly also for the Yakima project, or for the subprojects which have been approved, and the present status is that the specifications and plans for the Okanogan project, schedules 1 and 2, were sent in to Washington on March 23, and that the plans for the Umatilla project, as far as it concerned the storage dam, the principal item in the work, were sent in about a week later, about March 29, I think. An advertisement is out now, calling for bids on schedules 1 and 2 of the Okanogan project to be opened on June 27, and for the so-called Cold Springs dam on the Umatilla project on June 28.

The CHAIRMAN. Where do you have your office, Mr. Henny?

Mr. HENNY. In Portland.

The CHAIRMAN. Now, if you could take up these projects somewhat in detail we would like to have you do so. The time is rather limited, but I imagine that members of the committee would like to have a brief statement at least of the important features of each one of the projects that you are now undertaking in those two States, beginning, let us say, with the Okanogan project. How much land will that project irrigate?

Mr. HENNY. It will irrigate 8,650 acres, there being already irrigated 1,350 acres, and there being water during low seasons in connection with storage, for 10,000 acres all told, the water to be derived from Salmon Creek.

The CHAIRMAN. Do I understand you to say that in addition to the lands that have heretofore been irrigated you would expect to irrigate nearly 9,000 acres?

Mr. HENNY. Yes, sir; making 10,000 acres in all, which is about the ultimate capability of Salmon Creek.

The CHAIRMAN. Is the cost going to be pretty high?

Mr. HENNY. Yes; the cost will be, including ten years' maintenance, about \$50 an acre, and it is likely to be still higher because of the present labor conditions and the cement conditions. Everything is costing more.

The CHAIRMAN. What are the principal items of cost?

Mr. HENNY. It is fairly well divided. The principal structure in it is an earth dam near Conconully. At the lower end of the blue spot on the map is the location of the dam.

The CHAIRMAN. The spot you have indicated as the diversion site of the Umatilla?

Mr. HENNY. No, sir; higher up. It is an earth dam 80 feet high.

The CHAIRMAN. I see.

Mr. HENNY. That dam, including the lands to be purchased, will cost very near \$150,000 out of a total of about \$450,000.

Mr. REEDER. Is there any expense to that dam except labor and the purchase of the land? Do you put a core through it of some kind?

Mr. HENNY. No, sir; the principal expense is labor and land. But there are some outlet structures and spillway structures that call for a large quantity of cement.

Mr. REEDER. Then the question of cement does come in there. How far are you from the railroad? What is the expense of the cement when you get it there?

Mr. HENNY. About \$6 a barrel for the cement, delivered at the works.

Mr. REEDER. It is pretty expensive.

Mr. HENNY. Yes; there is a 50-mile haul by wagon. There is a prospect of bringing the cement to Alma, in the lower end of the irrigated district, by steamer, or bringing it to Riverside, but the rates are so high that it does not make much difference whether we avail ourselves of that or not, because after we get it to Riverside or Alma the cement would still have to be hauled a long distance.

The CHAIRMAN. You would use the Salmon River to a point below Clover and divert at the point indicated on the map?

Mr. HENNY. Yes; at the diversion weir. Before we leave the storage there, I would like to say one thing more, and that is that we have acquired, free of expense, the Salmon Lake Reservoir, just to the east of Conconully. It is to irrigate the land down below that which is irrigated now, and the owners have deeded to the United States that lake and all works in connection with it. We contemplate improving the outlet to a small extent, but we do not contemplate raising the lake. As it is it will store about 2,000 acre-feet, and the large reservoir below will store about 16,000 acre-feet. As you see, we will utilize the natural bed of the Salmon River to the diversion point, and there we are almost on the border of the irrigable land, so that the main diversion canal is comparatively short.

The CHAIRMAN. Where is the present diversion canal in that locality? Lower down on the Salmon?

Mr. HENNY. Yes; so far as the land is concerned, on the east side of the river, this is lower down, but also in Spring Coulee higher up there is irrigation, and diversion at that point will remain the same. Those people will continue to irrigate in the way they have been in the habit of doing, and the land there is a portion of the 1,350 acres that is now being irrigated.

The CHAIRMAN. What is the character of this land?

Mr. HENNY. The land is suitable for deciduous fruit raising, and it is likely to be subdivided to at least 40 acres, and in the course of events probably smaller, as more intense cultivation goes on.

The CHAIRMAN. A considerable amount of fruit is now being grown in that locality?

Mr. HENNY. Yes.

The CHAIRMAN. Do you think that land will stand a charge of \$50 an acre?

Mr. HENNY. Yes; I think it will stand considerably more charge. The only thing that I am afraid of is that the people are a little too sanguine. The land is selling for \$50 above now.

The CHAIRMAN. The land is selling for \$50 an acre above the reclamation charges?

Mr. HENNY. Yes.

The CHAIRMAN. How much Government land has been taken under the reclamation law?

Mr. HENNY. We started in withdrawing, and then there was a restoration made, and then there was a subsequent withdrawal; and this restoration introduces a difficult question. There are other additional difficult questions, for instance, as to whether a soldier's homestead is valid there, and as a result all the land matters are in a serious mix up, and about a month ago I recommended that a special agent of the Land Department be sent out there, so that the people will know where they stand, and so that we may know what is going to be excess Government land that can be disposed of.

The CHAIRMAN. There was a considerable quantity of this land relinquished when you made this investigation?

Mr. HENNY. Yes, sir.

The CHAIRMAN. But in any event there is a considerable quantity that was entered under withdrawal?

Mr. HENNY. Yes.

The CHAIRMAN. Of course some entries made at the time with the area originally withdrawn were restored?

Mr. HENNY. Yes; and a good many entries were made during the withdrawal and the subsequent restoration made appears to give them the same rights as though there had been no previous withdrawal.

Mr. JONES. It was first withdrawn and then restored, and then withdrawn again; but in the meantime, while it was open after the first withdrawal—under the first restoration—parties went in there and made entries.

The CHAIRMAN. There is no question about the status of those who made entries while the land was public domain. The difficult question, I take it, is the status of those who filed during the first withdrawal?

Mr. HENNY. Yes; as to how they are going to be affected by the subsequent restoration, which was followed by a new withdrawal.

The CHAIRMAN. Were all of the lands originally withdrawn restored?

Mr. HENNY. No, sir; not all of the lands. Some remained withdrawn, and a recommendation was made by the local engineer to restore those portions which were clearly not irrigable. That recommendation went to Washington and is correct. But as a result, through some error, the entire township—the very core and heart of this project—was restored.

There are some other complicated questions arising by reason of the Waterville land office allowing proof in one case and disallowing it in another, where there is no apparent difference. And even allowing proof where the land has never been restored, and it is very essential both from the reclamation standpoint and for the good of the people there that these complicated questions be solved so that everybody can know where he stands. That recommendation went in three weeks ago, I believe.

Mr. NEWELL. I would like to call attention to the fact that these land matters of restoration and withdrawal are handled by the Land Office, which is an entirely different Bureau, and with which we can communicate only through the Secretary's Office; and there are many things as to which we do not understand just why they are done, which are presumably correct; but we can never know the precise reason why this thing was restored, or why it was withdrawn.

Mr. REEDER. Is there more irrigable land in that section of this valuable land than can be irrigated for lack of water?

Mr. HENNY. Yes.

Mr. REEDER. Is it underlaid with water at any depth?

Mr. HENNY. There is lowland right along the river which lies low enough to be irrigated from the natural flow of the river itself. That we have classed as not requiring any water.

Mr. REEDER. Yes.

Mr. HENNY. But leaving that out there is an excess of land. And not only is there more land than we have water for right under the main canal at Salmon Creek, but in Spring Coulee there is beautiful land that could be easily reached.

Mr. REEDER. Is there water under that land so that it could be pumped?

Mr. HENNY. I could not say fully, but if the question of pumping came up (the Okanogan River has always plenty of water) in connection with our project a few miles below the main canal intake there is one drop of 105 feet and another drop of 15 feet. There is a possibility of developing power, and right on that main creek itself is a possibility of developing power when the irrigation reservoir is drawn on.

Mr. REEDER. That is just when you want it out of the ground, too.

Mr. HENNY. We have a hope of possible pumping of Okanogan River water to land on the east side of the river, in what is now called Colville Reservation, and I have reported on that to the chief engineer. There is more beautiful land on that side of the river than we will probably have power for.

Mr. REEDER. Why would you not take that out by gravity?

Mr. HENNY. Because the river has a very flat grade. It is probably not over 3 or 4 feet to the mile.

Mr. REEDER. And the land is too high?

Mr. HENNY. It may be 50 feet high, and it would take altogether too long a canal by gravity.

Mr. JONES. What is the elevation of Pogue Flat?

Mr. HENNY. I think it is about 1,200 feet above the ocean. It lies very low. So that the ultimate full use of water with power there should result in several thousand acres more under irrigation. It is simply a matter of money. We have estimated the cost of the project at some \$50,000 less than the \$500,000 that has been set aside, and, personally, I have always had in mind the possibility of using that \$50,000 for installing some pumps, if we can get the proper land in the Indian reservation. With the rise in the price of labor and the price of cement lately, I am not very sanguine about saving very much out of it.

The CHAIRMAN. Yes, everything will cost you a little more than it has been costing you in the past.

Mr. HENNY. Yes.

The CHAIRMAN. What is your farm unit in this project?

Mr. HENNY. Forty acres. It is both the farm unit and the limit which may be retained by private owners.

The CHAIRMAN. You are reducing the private landowners to 40 acres?

Mr. HENNY. Yes, and it is entirely satisfactory.

The CHAIRMAN. Are you doing that anywhere else, Mr. Newell?

Mr. NEWELL. No, I do not think that is being done anywhere else.

The CHAIRMAN. That is entirely satisfactory there, is it; that is, reasonably satisfactory?

Mr. HENNY. Yes.

The CHAIRMAN. I think it is very wise.

Mr. HENNY. Yes.

The CHAIRMAN. Have you thought that it might be wise to reduce the limit of public land even further than that?

Mr. HENNY. In connection with this project at this time I would hardly deem it a wise measure. I will treat of that when we come to the Umatilla project.

The CHAIRMAN. Is there anything else in regard to this project that members of the committee desire to bring out? If not, we will pass to one of the other projects.

Mr. HENNY. Shall we take up the Yakima situation?

The CHAIRMAN. It will be entirely satisfactory to the committee.

Mr. HENNY. In order to understand the Yakima situation fully, I think it is necessary to consider it a little wider than mere sub-projects which have so far been authorized. The Yakima River during its summer flow has been completely appropriated by the present irrigation canals, of which there are about 60, and in order to do any work there—any additional large irrigation—it is necessary to store the flood water. The opportunities for storing are extremely favorable and economical. There are three lakes at the head of this valley—Lake Keechelus, Lake Kachess, and Lake Clealum. By building dams across the outlets it will be possible to store in the neighborhood of 600,000 to 700,000 acre-feet economically.

The CHAIRMAN. The water is available, is it?

Mr. HENNY. Those lakes, Mr. Chairman, have a great capacity. The Keechelus and Kachess lakes should fill several times over each year. In the Clealum Lake the flow is 50 per cent in excess of the highest dam we could build there, which is 150 feet high, and this work can be done more or less progressively. To construct a larger dam, for instance, at the outlet of Lake Clealum would require an excavation in front of it for laying the foundation bare.

The CHAIRMAN. Is there opportunity for storage in the Kachess?

Mr. HENNY. Yes. It is necessary to provide some storage in the Kachess.

At Bumping Lake there is another opportunity for storage, and at McAllister Meadows in the Tieton. That storage is so extremely expensive that we have left it out of present consideration, although the land withdrawn there will probably remain withdrawn, for ultimate future use, when the lands have risen in value.

With that storage gradually developed the idea is to take up successively the irrigation of lands in that valley, commencing with the Tieton subproject for which the Secretary has set aside a million dollars, which is to irrigate about 20,000 to 24,000 acres right in the vicinity of north Yakima.

Farther down the valley is the Sunnyside project for which the Secretary has set aside \$750,000, including \$250,000 to be paid to the Washington Irrigation Company for the present Sunnyside canal. There is opposite the Sunnyside subproject the Indian reservation

which, under the new bill which became a law a couple of months ago whereby the Indians will be enabled to dispose of three-fourths of their holdings, will be made over into another reclamation project as soon as money for such project is available.

Then in the northern part, the upper part of the valley, is the Kittitas subproject, which is capable of irrigating about 40,000 acres. It is a very expensive project owing to the length of the canal, and the difficult country through which the canal will cross, and it is not only the most expensive of them all, but the lands are less valuable than in the others, being higher up, at an elevation of about 2,000 feet.

Lower in the valley there is the Ledbetter project, which is the largest project, by far, containing about 175,000 acres of land that lies very low, and is very valuable land. It lies about 500 feet above the ocean and it also includes the lands about Kennewick.

Mr. KENNEDY. Why do you call these subprojects?

Mr. HENNY. The development of storage at the headwaters of the Yakima River is to be undertaken for the benefit of all the projects combined. It will be gradually increased as the projects themselves are increased, and that is the element that unites every project in the Yakima Valley.

Mr. KENNEDY. Then the storage of the water is considered the main project, and all these projects subject to that system are called subprojects?

Mr. HENNY. The official name should be "project" at the present time, inasmuch as the Secretary of the Interior has set aside a million dollars for the Tieton project. I use this term so that you may understand the general project as it will gradually develop.

Mr. JONES. The object is ultimately to reclaim all the irrigable lands tributary to the Yakima River?

Mr. HENNY. Yes, sir. Now, that may be termed the Yakima project, but it can not all be done at once, as that would involve the reclamation of some 400,000 acres of land. It can not all be done at once, but it is divided up into sections, and hence these subprojects.

The CHAIRMAN. The Ledbetter subproject is to provide for the irrigation of the large tract indicated on the map by a gravity canal on the Yakima side?

Mr. HENNY. Yes.

The CHAIRMAN. That country must be very flat. I notice that your canals parallel the Columbia and run in the opposite direction.

Mr. HENNY. That is right. The Columbia is very flat. There is considerable fall in the Yakima River from the point where we take it out, and at present there is a power development on the Yakima River above the dam of which we expect to take out the water. But there will be some pumping in connection with that project, at a place where the water for the lower lands will be dropped out of the main canal, at which place waters can be pumped for the irrigation of lands above the main canal.

The CHAIRMAN. You say that you are now about to undertake the construction of the Tieton subproject?

Mr. HENNY. Yes.

The CHAIRMAN. Will you give the committee a brief statement as to the principal features—important features—of that project?

Mr. HENNY. There will be required in addition to the flow of the Tieton River, which we will be entitled to take during a certain season of the year, storage amounting to about 50,000 acre-feet, about 30,000 acre-feet of which can be and must be obtained on the headwaters of the Naches to replace water which we take out of the Tieton, and which is claimed below the point where the two streams come together.

The CHAIRMAN. How much land do you expect to irrigate in addition to the present lands irrigated?

Mr. HENNY. About 20,000 or 24,000 acres under that project.

The CHAIRMAN. What will be the acre cost there, approximately?

Mr. HENNY. Including ten years' maintenance it will very likely be between \$50 and \$60.

The CHAIRMAN. What is your unit of entry, the maximum?

Mr. HENNY. The farm unit recommended to the Secretary is 40 acres, and the limit for private ownership is 80 acres. In the case of the Okanogan the Secretary, as I remember, has passed on our recommendations. In the case of the Tieton he has not passed on it. There is simply the recommendation of the soils department and of the engineers. The same limits hold good for the Sunnyside project.

The CHAIRMAN. What are the principal items of cost of this project?

Mr. HENNY. The largest item of cost is the canal marked "proposed Tieton canal," on this map, emptying out into a tunnel along the Tieton River. That is going to be an extensive canal, which is to be constructed in a canyon on a steep sidehill.

The CHAIRMAN. That is a tunnel of what length?

Mr. HENNY. That canal will be about 10 miles in length, with a possibility of extending it 2 miles more, as a matter of economy, to get more grade.

The CHAIRMAN. The canal on sidehill cutting will be that long?

Mr. HENNY. On sidehill cutting. Then we have a tunnel over 2,000 feet in length. From that on is a rather expensive main lateral, which skirts the hills. The country is very rough there as far as Cowiche Creek.

Also there will be a construction of an earth dam at Bumping Lake. Thirty thousand acre-feet of the required storage is to come from Bumping Lake. The main expense is in the canyon canal.

The CHAIRMAN. Your present work contemplates the Bumping Lake reservoir?

Mr. HENNY. Yes.

The CHAIRMAN. An ordinary earth dam?

Mr. HENNY. Yes; an ordinary earth dam, comparatively low; I think not to exceed 60 feet.

The CHAIRMAN. Are the lands under this canal as good as the lands generally about North Yakima?

Mr. HENNY. There is hardpan underlying these lands all the way from 6 and 7 feet in depth to 2 feet, and finally 6 inches.

The CHAIRMAN. Impervious?

Mr. HENNY. No; probably not impervious. We made a very careful examination of that, and got the soil experts to come in and examine it closely and to make a report, with the result that the experts say that when there is 24 inches of earth the land is as good as any

land; that the hardpan has a tendency of gradually breaking up when the water is put in. There is a large amount of land under irrigation by the present ditches where the hardpan is no deeper than that, and the owners consider those lands of equal value to any other lands around North Yakima.

The CHAIRMAN. A considerable portion of the lands around North Yakima that are now under irrigation are so underlaid?

Mr. HENNY. Yes; between North Yakima and the Tieton project there is a canal that is called the Congdon ditch. There is a large acreage which is similarly underlaid, but there is no such hardpan on the East Yakima.

Mr. JONES. And that land is the most valuable about North Yakima.

The CHAIRMAN. That hardpan you think may dissolve in time under irrigation?

Mr. HENNY. Yes; I have seen very clear evidence of it. I have seen places where there was no soil, only hardpan, and the water has got to have time to act upon it sufficiently to crumble it up. Still, when it comes to making the farm unit and drawing the line between what is irrigable and what is not irrigable, we propose to draw on the soils experts of the Reclamation Service to give us the best advice. If we leave out certain land for certain reasons, the owners are sure to say that it is just as good as the rest, and we want the best possible judgment on the subject.

Mr. JONES. Experience has shown that the farther back over the hills you go the more valuable the land is for fruit purposes, so that many of our people think that the lands to be reclaimed under the Tieton project are more valuable than the lands already reclaimed around North Yakima.

Mr. REEDER. Do you say that the water supply is greater than the land in that section?

Mr. HENNY. No, sir.

Mr. REEDER. You will finally have a lack of water?

Mr. HENNY. Yes; we have a lack of water over the whole valley.

Mr. REEDER. Is that land underlaid with water?

Mr. HENNY. Not at the present time, to any extent.

Mr. REEDER. It is not underlaid very much where this hardpan is?

Mr. HENNY. No.

Mr. REEDER. Then you would not have fall enough in your ditches or your water supply to pump, anyway?

Mr. HENNY. We will probably have a small drop, but I do not think it would be worth while to consider that as an important feature. There are all manner of possibilities of power development on the Tieton and Kachess rivers that would be superior, and there is now a power plant built for the supply of North Yakima.

The CHAIRMAN. You think there is no question about these lands standing the charge of \$60 an acre?

Mr. HENNY. Not the least.

The CHAIRMAN. Is there any land that was Government land at the time of the segregation under this project?

Mr. HENNY. There is none, in a certain sense. There are a large number of entries that will be shown to be fraudulent. I mean fraudulent simply in the sense of not having complied with the law.

The CHAIRMAN. That is, entries made prior to withdrawal?

Mr. HENNY. Prior to withdrawal; which fall back into the public domain by reason of not complying with the law.

Mr. KENNEDY. To what extent are private projects in force now in Washington?

Mr. HENNY. I do not fully understand the question.

Mr. KENNEDY. To what extent is irrigation carried on in Washington by private enterprise?

Mr. HENNY. In the State of Washington?

Mr. KENNEDY. Yes.

Mr. HENNY. Probably there is irrigated in the State of Washington in the neighborhood of 200,000 acres, of which about 125,000 acres is in the Yakima Valley.

Mr. KENNEDY. Is that a success?

Mr. HENNY. Wherever I have seen it it is a success. It is a success in the Yakima Valley, and it is a success in Wenatchee and in Kennewick.

Mr. KENNEDY. Do you know, approximately, what it has cost for that work carried on by private enterprise, per acre?

Mr. HENNY. I can answer that as to what the charges are for the water right per acre. The Washington Irrigation Company, which has sold its canal to us, has been charging for years back \$30 an acre, on the basis of 6 per cent on deferred payments. They have during the present year, before they knew whether the Secretary would take up the option, increased it to \$40 an acre. At Kennewick is the Kennewick Canal, which virtually belongs to the Northern Pacific Railroad Company, although under a different name. They have been selling at \$30, and, as people began to come in, at \$40, and now \$75.

Mr. KENNEDY. I presume that the fact is that these private concerns took the easiest propositions?

Mr. HENNY. Yes; although the Kennewick Canal did not prove to be an easy proposition, and that explains to some extent why they are charging from \$40 to \$75 per acre.

Mr. JONES. I would suggest to Mr. Kennedy that there are several of these cases in which the original promoters of the canals failed.

Mr. HENNY. The Sunnyside canal was in the hands of a receiver for years.

Mr. JONES. Yes; and went over to the creditors.

Mr. KENNEDY. Has the Government bought out any of these defunct concerns?

Mr. HENNY. It has bought this Washington Irrigation Company.

Mr. JONES. The canals are not defunct. They have all kept on running. The old concern has gone, but the new concern has taken its place in each case.

Mr. HENNY. The Washington Canal is largely owned by Mr. Denny, of Seattle, who owns most of the stock.

Mr. KENNEDY. Is there any conflict or controversy at all between the private concerns there and the reclamation service which the Government is conducting?

Mr. HENNY. Yes; there is a little remnant. There were about sixty canal companies to get together to agree upon the limits of their claims to water. It was a gigantic task, but the people are very

intelligent, and they took the thing in a broad-minded way, and with the exception of about three or four they all came in line, so that they have virtually done what we suggested, to go ahead and divide the extreme low water flow of the stream as they thought best. During 1905 and 1904 it took the low water flow to supply them. There was, in fact, litigation commenced, and the Government took the stand that they were entitled to the extreme low water flow, and we left them to divide it themselves, and when they got through there were only four, I believe, who had not come in. With two of them there is only a limited amount of land that they could serve, and the other two are at the lower end of the valley where the return water will probably be more than they can justly claim.

Mr. KENNEDY. Is there litigation now pending?

Mr. HENNY. There was litigation pending against the Indian officials, and an injunction against them for trying to get more water than the other people thought they were entitled to, and that litigation was spreading so that everybody in the valley was gradually called in, and one of the terms of the agreement that has been signed is that this litigation shall be stopped.

Mr. KENNEDY. So that it is a clean slate?

Mr. HENNY. Yes.

Mr. JONES. It is all practically settled. They have agreed between themselves as to the right to the extreme low water flow of the river.

Mr. HENNY. We have just purchased, at Lake Clealum, 160 acres, and we have just compromised with the people who at the outlet own a little dam. We allow them 28 second-feet, and I consider that that is a very good compromise on the most important storage basin in the valley. At Lake Kachess there is a dam. We have been trying to compromise with its owners, but so far with no results, and it may be necessary for the Land Department, and possibly also for the reclamation service, to commence action to determine title. The Keechelus also has a small dam on it which has never been finished. It was built by the Cascade Lumber Company for the purpose of driving logs, and we have discussed matters with the owners and the president, and there does not seem to be any possibility of any trouble. Whatever change the Government would make would be in their favor.

Mr. KENNEDY. It would be helpful to them rather than otherwise?

Mr. HENNY. Yes. So that the only question now is for the determination of the rights at Kachess.

The CHAIRMAN. Are there any further questions in relation to the Tieton project? If not, we will pass to your next project there.

SUNNYSIDE PROJECT.

Mr. HENNY. The present canal in the Sunyside project irrigates 40,000 acres. In purchasing this canal it is incumbent on the Government to recognize these rights. The canal was purchased for two reasons. In the first place, because it was a good deal, inasmuch as the canal can now carry and has made good water rights to about one-third more land than it has conceded water rights to. But what made more than anything else for the purchase is that it held the key to the entire situation in the Yakima Valley.

That was one of the oldest canals that could make good a high paper claim when it came into court, and as a result somebody else would have to be robbed of water, and that litigation would be liable to last five years or more, and it was essential, if the Government was to prevent litigation there and to go in there at all, that that claim be purchased, and from the financial side it appears to be a very good proposition. There are various ways of estimating the value of that canal, but on the basis of its capacity, what it has now available over and above what is necessary to satisfy its obligations, the value of it foots up somewhere about \$350,000. We pay \$250,000 for it.

The CHAIRMAN. You say in addition to the amount you pay for the canal you assume the canal's obligations? What are they?

Mr. HENNY. They are to continue to supply the water to people that have purchased water rights on the basis of \$1 a year maintenance.

The CHAIRMAN. The Government, then, will continue, unless it makes some other arrangement with these people, to furnish them with water on the same basis as the canal company furnished them water?

Mr. HENNY. Yes.

The CHAIRMAN. As a matter of business, is that a paying arrangement—that arrangement of \$1 per year per acre charge?

Mr. HENNY. It has been for the company. There have been people that under the laws of Washington have thought that they might compel the company to charge no more than cost, and during a short time, under that idea, Judge Hanford fixed the price at 50 cents. As a matter of fact, it has not been very far from a dollar under company management, owing to the tendency of the company to throw charges that are doubtful into maintenance.

The CHAIRMAN. You say that the court has fixed the charge at 50 cents?

Mr. HENNY. Under the Sunnyside, yes, sir; and the company subsequently went into court and succeeded in making Judge Hanford see that it was altogether too low, so that he let it stand at a dollar.

Mr. JONES. I suppose that was during the time they were in the hands of a receiver?

Mr. HENNY. I do not know about that.

Mr. JONES. That was the only time that the court would have anything to do with them.

Mr. REEDER. The contract would stand at any other time?

Mr. HENNY. Yes; that was during the time that the company was in the hands of a receiver.

The CHAIRMAN. You purchased this canal largely for the purpose of preventing possible complications in carrying out your work there, because, as I understand it, it is necessary, if there is to be a further irrigation of the lands down the valley on that side to use this canal?

Mr. HENNY. No, sir; that was not the principal object. It was necessary because if the various paper claims of those canals be added together they far exceeded the amount of water in the river. Now, they had come to the point where the actual diversions absorbed the entire low-water flow, and the conditions were just right for commencing litigation to see who was entitled to take away from some-

body else water that they had taken before, and this Washington Irrigation Company had been continually extending the land irrigated from year to year, and they had a paper claim of 1,050 second-feet where they had been diverting only 650 feet.

The CHAIRMAN. That was for water for lands on proposed extensions, was it?

Mr. HENNY. And for land right under their main canal that had not taken any water.

Mr. JONES. All the land that can be irrigated from the canal as constructed has not been irrigated, but they can carry water to irrigate several thousand acres lying under the canal as constructed. They had been gradually developing it from year to year as fast as they could.

The CHAIRMAN. Now, you propose an extension of this canal?

Mr. HENNY. Yes.

The CHAIRMAN. Using the present canal also?

Mr. HENNY. The ultimate development of the entire Sunnyside project contemplates the spending of about \$2,000,000, of which there is now about \$750,000 available. It contemplates the enlargement of the canal; it contemplates the reconstruction of a number of the structures; it contemplates the extension of several miles at the lower end, until, as you see on the map, the width of the irrigated country peters out; and it contemplates carrying the water across the river to irrigate lands near Mabton and Prosser. Out of the \$750,000 that we have, we have to spend \$250,000 for the purchase price of this property. That leaves us \$500,000.

It is now a matter of study as to exactly how to spend that \$500,000. We can do it by replacing a few structures and extending the canal without any enlargement, and covering considerable land that is now not irrigated, but still lies under the canal; or we can do it by commencing at the upper end of the canal to enlarge it to its full size as it will ultimately be, and spend the money in that way. The intention is to spend the money so as to get the most good quickly.

The CHAIRMAN. How do you propose to get your returns to the Sunnyside project? Of course so far as the lands now irrigated are concerned, I assume that you can not place any additional charges upon them.

Mr. HENNY. No. If we were to think it best, we could do nothing there except to extend the laterals and cover with the water and the canal as it is now about 10,000 acres more of land.

The CHAIRMAN. The best you can do under the Sunnyside is to cover 10,000 acres of land in addition to that already irrigated?

Mr. HENNY. No. That we could do practically without spending any money; without enlarging the canal.

The CHAIRMAN. Without enlarging it?

Mr. HENNY. Yes. That would cover the lands that have now no water right.

Mr. JONES. That is under the canal as it is now constructed?

Mr. HENNY. Yes.

Mr. JONES. Without any new construction?

Mr. HENNY. Yes.

Mr. COOPER. Except the building of the laterals?

Mr. HENNY. Yes. There is 10,000 acres of that. Those lands have been purchasing the water right at \$30 an acre, and lately \$40.

You can see that the company might go ahead there and just take in about \$400,000.

The CHAIRMAN. Now, with that prospect ahead of them, how were you able to purchase the Sunnyside canal, with its dollar an acre charge, for \$225,000?

Mr. HENNY. Why should they sell to us on that basis?

The CHAIRMAN. Yes.

Mr. HENNY. Because the people feared litigation. They knew what it meant; that if they once begin to litigate, there would be no end. The water supply was constantly getting closer and closer.

The CHAIRMAN. You say you feared they would litigate?

Mr. HENNY. No; they feared litigation. If the litigation had been once commenced everybody in the valley would have been involved, and everybody would have been in court for five years at least, and nobody knew what the outcome might be.

Mr. KENNEDY. You mean between the original company and the people?

Mr. HENNY. No; I mean between the original company and every other canal company.

Mr. COOPER. There was such an overlapping of claims and such a conflict of interests that nobody felt sure of what they had or could feel sure of what they would have?

Mr. HENNY. Development has been going on for twenty years, and there are 40,000 people along the river, and they will fight for what they consider their rights. That was what was staring this and every other company in the face. They simply let go. They have some land there which they will continue to sell. That is where their present income will come from. That is what made the sale of the water rights so slow, and that is what has wrecked so many irrigation companies.

The CHAIRMAN. You say the company owns lands now under the canal not now irrigated?

Mr. HENNY. Yes.

The CHAIRMAN. Lands for which they own the water right in the soil?

Mr. HENNY. They own the water right to about 9,000 acres under the canal. They reserve the water right.

The CHAIRMAN. They own that land?

Mr. HENNY. They own that land. That is land that they were trying to sell off independent of the additional 12,000 or 15,000 acres that they do not own, and which also lies under the canal.

Mr. KENNEDY. In addition to the water right, is there any compensation to be paid to the Government for that, or is it a clear reservation on the part of the company?

Mr. HENNY. That is a clear reservation.

The CHAIRMAN. A clear reservation carrying over the obligation of \$1 a year per acre to the reclamation service?

Mr. HENNY. Yes; and that compensation will be paid after the year 1907, whether the land is irrigated or not.

The CHAIRMAN. Then the company is, in addition to its \$225,000, getting, retaining, water rights to pretty nearly 10,000 acres, which it may sell for \$40 an acre?

Mr. HENNY. Which it may sell for all the way from \$75 to \$100 an acre.

The CHAIRMAN. The land and the water rights?

Mr. HENNY. Yes; because they own that water right, and if the land were worth only \$40 an acre with the water right the land would not be worth anything, because that is what the water right will cost.

Mr. KENNEDY. You spoke about the lack of confidence as to what people served could rely upon. Is there any such feeling on the part of the people served there as to the Government project?

Mr. HENNY. No, sir; they now feel that now that the Government has finally decided to go in there, and all these mutual agreements have been signed, the fear of litigation is past.

Mr. KENNEDY. And that they can rely on what they have contracted for?

Mr. HENNY. Yes; and they feel that they want a division of the water under Federal control. We do not want it other than to see that we get what we are really entitled to.

The CHAIRMAN. As I understand, the feeling of security arises from the fact that there has been an adjudication of the water rights now on that stream.

Mr. JONES. By mutual agreement. And that adjudication is fixed now, as I understand it, and is entered of record?

Mr. HENNY. It is entered of record.

The CHAIRMAN. So that now everybody knows what their rights are and you begin on the proper basis?

Mr. HENNY. Yes.

The CHAIRMAN. I want to ask what you mean by "adjudication?" Was there some court record of it, or is it simply a settlement reduced to writing?

Mr. HENNY. Of course there was an agreement.

Mr. JONES. There was a mutual agreement signed by all parties of interest, which is now placed of record.

Mr. COOPER. It was simply a merging of all interests in the one common source.

The CHAIRMAN. That was done as the rights accrue under your law; but in the absence of any record in Washington for the water rights they simply took these rights up and assumed the right to use the water, and the adjudication came then not as it would in Nebraska, under your law, in the regular course of development, but by mutual agreement. You have prepared by statute for all future initiations of rights.

Mr. JONES. The Government determined that the low water flow of the Yakima River was about 2,000 feet, and that the ditches constructed for diverting water had already diverted all of that, so they said to the people of the valley, "We recognize your right to the low water flow of the Yakima Valley, but the division of that water you must settle among yourselves." The people then entered into an agreement among themselves that ditch "A" was entitled to 2 cubic feet, and ditch "B" was entitled to 5 cubic feet, and ditch "C" was entitled to 3 cubic feet, and so on, up to the aggregate of the low water flow, and thereby fixed the amount that can be claimed by the canal. They did that on the prospect, on the assurance, of the Government coming in. Without that they could never have had any such agreement, and they would have had to go into the courts.

Mr. KENNEDY. So that there is good feeling there now?

Mr. JONES. Absolutely the best of feeling.

Mr. COOPER. Will not the management of this distribution of the water by the Government be more economical than it could possibly be heretofore?

Mr. JONES. Of course, the Government will not manage all these various canals.

Mr. COOPER. But they really control the whole water supply. The Government is really the central managing force, I should think?

Mr. JONES. Well, no. For instance, the Congdon canal the Government has nothing to do with the management of. Now, what the Government will do is that, if they conclude that the canal is taking more than it is entitled to under this agreement, it will hold it down to it.

The CHAIRMAN. Have you not provided by law for the administration below, to see that people do not take more water than they are entitled to? Have you not provided water commissioners, etc.?

Mr. JONES. There was a law passed for water commissioners, but it has never been carried out. If the present interests were taking more water than they are entitled to they would have to go into court to stop it.

The CHAIRMAN. It would be necessary to do it, because of all the uncertain and unsatisfactory processes that I know of the most uncertain and unsatisfactory is to go into court to keep a man from taking more water than he is entitled to.

Mr. JONES. Of course, the principal thing that the Government will have to do with is the main canals, and the question is whether, at their headgates, they are taking out more than they are entitled to.

The CHAIRMAN. But if you do not have some machinery by which those agreements will be enforced, and enforced immediately, you will have no end of trouble, in my opinion.

Mr. COOPER. It seems to me that the Government control in this case is so limited that it does not have much to do with it.

Mr. KENNEDY. It is a question of supply.

The CHAIRMAN. I thought you did enact an irrigation code in your State last year.

Mr. JONES. They enacted a law giving the Government certain rights.

The CHAIRMAN. Have you not a State engineer now?

Mr. HENNY. No, sir; there was an attempt made in that direction.

The CHAIRMAN. The State of Washington is moving slowly.

Mr. KENNEDY. In that respect.

Mr. HENNY. The action of the legislature was to give the reclamation service a right of withdrawal of water. There was an attempt made to get a code along the lines you have suggested, and that attempt will be renewed, because I think everyone recognizes the necessity for some adequate control.

The CHAIRMAN. It is of infinite importance.

Mr. HENNY. But if we do not get it—

The CHAIRMAN. During the period of construction there will be no difficulties.

Mr. HENNY. After that I would, of course, very much like to see that controlled by State laws; but the people are very intelligent, and they would come pretty quickly to the control by the government of

all the water. They would solve that question very intelligently and quickly, I believe. But we will make a strong effort in the direction of such legislation.

The CHAIRMAN. I think the water master should be, under the law, without question a man satisfactory to the people of the valley, and you have got to have some one in authority to handle these things finally.

Mr. HENNY. A good deal has been done by mutual agreement now, and if they say by mutual agreement that this water master shall be all powerful to close or open head gates, he will absolutely control the situation.

The CHAIRMAN. That is all true, so long as everybody lives up to it.

Mr. HENNY. One word more. There has been appropriated \$1,000,000 to the Tieton project and \$750,000 for the Sunnyside project. The people under the Tieton are clamoring for us to lay our ditches as high on the hillsides as we can. If we should comply with that request, the \$1,000,000 that has been appropriated would be insufficient, and more money might be required.

On the Sunnyside project \$250,000 will be expended for the purchase of the Washington Irrigation Company, and of course that will leave only \$500,000 available, where the construction is to cost about a million and a half, and that is only a beginning, and we will need future appropriations.

The CHAIRMAN. Do I understand that you can complete the Tieton project with the money now available?

Mr. HENNY. That depends on this. If we lay the canals about where we laid them in the original estimate, we can, unless the price of labor becomes exorbitant; but if we comply with the requests of these people who own good lands above that project, it is possible to take in 26,000 acres more of that land, and we can not complete the project for that amount of money.

Mr. REEDER. How much more will you take in?

Mr. HENNY. We have figures from 20,000 to 24,000 acres, and it is possibly to take in perhaps 2,000 or 3,000 more. That, on the basis of \$6 an acre, means a considerable addition.

Now, there is the Indian reservation. Under the present conditions it will be up to the Indians themselves to sign agreements by which they dispose of three-fourths of their land. I presume an early trial will be made by the Indian superintendent, and if that turns out favorably, as he stated to me it would, it will be up to the Reclamation Service to get more money to start there.

The CHAIRMAN. How expensive a project will it be to carry up to a proposed high-line canal there?

Mr. HENNY. The project is a very cheap one, comparatively speaking.

The CHAIRMAN. That is, if you simply irrigate the lands under the present Indian canals?

Mr. HENNY. I mean if we irrigate practically all the lands in the basin that are irrigable within an ordinary reach.

The CHAIRMAN. Of course, any additional irrigation there will require storage?

Mr. HENNY. Yes. That storage would come from the upper lakes, where the storage is very cheap, costing about \$6 an acre.

The CHAIRMAN. One very interesting question you will have to

meet in connection with the subprojects is the influence of the distribution of the cost of storage there, is it not?

Mr. HENNY. Yes; and about a month ago I suggested that the appropriation be divided—so much to one and so much to another subproject—and that there be a general storage fund available that will ultimately, with the completion of each project, be divided in proportion to acreage. As it is now, we have had to figure on the Tieton, so much to be spent on storage, and so much for the Sunnyside; and we are now making estimates on that.

The CHAIRMAN. Your storage for the Indian reservation works would be at the upper lakes?

Mr. HENNY. Yes. That project probably could be built complete for less than \$25 an acre, exclusive of maintenance.

The CHAIRMAN. That land seemed, when we went through there last year, to lie in a peculiarly favorable position—as good as the Sunnyside land.

Mr. HENNY. Some of it is as good as the land opposite, at Zillah, which is the best of it. The flat bottom land I do not think is as good as the best Sunnyside land.

The CHAIRMAN. It would be more difficult to keep it drained?

Mr. HENNY. We would have to figure on a drainage system, which we did not on the Tieton. And that is where considerable of the expense will come. As I stated, I think that the cost of that project will be \$25 an acre, including storage, but not maintenance.

The CHAIRMAN. What is the condition of those Indian canals? Were they fairly well constructed?

Mr. HENNY. They are fairly well constructed, with one exception, and that is that a portion of the canal loses as much as 40 per cent of water. It passes through open gravel banks, and it was expected it would silt up, but it has not done so.

The CHAIRMAN. I see.

Mr. HENNY. And I think it will be considerable of an expense that will have to be provided. Otherwise you will make the drainage system so much the harder to work successfully.

The CHAIRMAN. Are these canals so constructed, except at the point of the main canal where you leave it, sufficient for the land under them?

Mr. HENNY. There are 125,000 acres of land there, of which probably 100,000 or more is irrigable, and at the present time there is irrigated less than 20,000 acres from two canals—virtually four canals, but two main canals—so that those canals would have to be very greatly enlarged. I have recommended to the chief engineer that if possible at least \$100,000 be obtained for the development of this project, simply to secure storage water for the lands which are now irrigated which have no summer water, to get summer water by means of storage.

The CHAIRMAN. As a matter of fact, did the Indian department go into the mutual agreement as to water use?

Mr. HENNY. No; and it was not necessary. The law that was passed that Mr. Jones introduced in the House was sufficient, and it was not necessary. It now comes in as a reclamation project.

The CHAIRMAN. I understand; but you have not adopted it as a reclamation project up to this time. Up to this time that canal system is still under the Indian Office, and the Indian Office is pro-

posing—or the Indians are proposing—to irrigate some lands this summer.

Mr. HENNY. Yes.

The CHAIRMAN. You have not bought their canals, and have not any control over them for the time being.

Mr. HENNY. We assume that we do not.

The CHAIRMAN. What are they going to do for water this summer?

Mr. HENNY. They are going to take it out of the river.

The CHAIRMAN. What if some of these people who entered into the mutual agreement object to that? These Indians are not included in the mutual agreement which took up all the low-water flow of the river.

Mr. HENNY. We assume that they will be entitled to the same low-water flow as they have been taking heretofore.

The CHAIRMAN. Why did not the Indian Office come in, like any other sensible Indian, and set up its claim for its share of the water of that river?

Mr. HENNY. I could not tell you exactly why, except that we did not try to get them.

The CHAIRMAN. I should think they would have wanted to.

Mr. HENNY. They wanted to, but they wanted to claim the entire river; that was the trouble; and they were in litigation and they did not want to concede anything to the reclamation service. But they claimed under these Indian reservation rights they were entitled to the entire river.

The CHAIRMAN. Beyond the question of the reclamation service, if all creation was coming into a mutual agreement there, it seems to me that the part of wisdom would have been for the Indian Office to come in under that agreement and get what they could.

Mr. COOPER. Do they take their water higher up or lower down than the Sunnyside people?

Mr. HENNY. Higher up. And that led to the trouble last year, when they were enjoined from maintaining a temporary dam by which they were trying to catch more than they were entitled to.

Mr. COOPER. That makes the interests above.

Mr. HENNY. Yes.

Mr. COOPER. That makes it possible to separate these propositions?

Mr. HENNY. Yes. In answer to the question of the chairman, there were two matters. If we could get the Indian Office to take a reasonable use of it, and take as much as they had been taking, like anybody else, that would have been one matter, but that view seems to be hopeless, according to the local superintendent, Mr. Lynch, and the chief engineer, Mr. Code.

There was another solution, and that was to provide some storage water for those lands; not to allow that 125,000-acre patch of land right in the center of the valley to go with only partial irrigation for years to come, but to try to arrange that it might become a reclamation project, and that we might figure on storing water in the upper lakes for that land. There were two solutions, and we thought that the last solution was the best one, and Mr. Jones then drew this bill.

The CHAIRMAN. The law allows the Secretary, if he in his wisdom concludes to undertake a project here, to utilize these lands as he would other lands?

Mr. JONES. Let me suggest this: As I understand in making these mutual agreements the amount of water that was originally diverted for use on the Indian reservation was still left to the Indians. Is that correct?

Mr. HENNY. Yes.

The CHAIRMAN. But, then, the Indian Office is in the way in that?

Mr. HENNY. Yes. Their right to all the water that they had heretofore is recognized by the people.

Mr. JONES. In the settlement of their rights they just left out the amount of water that the Indian reservation had heretofore used?

The CHAIRMAN. But of course the Indian Office is in the position of having no record anywhere of having any water right.

Mr. JONES. We talked over this with the Indian Office, and they finally agreed that this was the best way to take care of the Indian lands; because if they did come in, all that they would be entitled to that anybody could say, would be about 147 cubic feet, which is what they have diverted. If they bind themselves to that, there is no way by which additional lands would be reclaimed there.

The CHAIRMAN. I should not think that would follow at all. It seems to me if I wanted to start a reclamation project under the present reclamation law I would get title and stand fast to it, to every drop of water I could, and then that would not prevent my going on and storing all the water that I could get to increase my project by storage. As I understand it, the situation here now is that they have no record right to any part of the ordinary low-water flow of this stream, and therefore the Reclamation Service now, by reason of their not taking advantage of their opportunity to get in—if there was such an opportunity—and to get a part of the water and recognition of their right to a part of the water, must now provide for all of the water by storage.

Mr. JONES. No, no, no; that it not it.

The CHAIRMAN. Unless, as you say, there is water left in this stream that has never been measured, and that nobody recognizes, and that is not of record. That is not a record right.

Mr. JONES. It is a record right just as much as the other, because the Indian Office have it and the reclamation people recognize it and the Secretary of the Interior controls the whole proposition so far as that is concerned; and in their division of this water they set aside 147 cubic feet for the Indians, and they told the people there, "Now you divide the balance," and they did it, and that is the basis on which their rights are considered.

Mr. REEDER. Is it on record?

Mr. HENNY. It is on record through the reports to the Secretary—both from the Indian Office and ourselves.

The CHAIRMAN. Your bill did not and could not go into the question of any water or right to water from the Yakima River. It was a simple proposition that if under the law you should have a project there you could utilize this land.

Mr. JONES. The situation was simply this, that that reclamation bordered on the Yakima River. The Yakima Indian Reservation borders on the Yakima River, and this reservation was established by treaty in 1855, and in that treaty the exclusive right to fish in the river was reserved to the Indians. The claim has been made on the part of the Indian Office that by reason of that reservation they were

entitled to all the waters of that stream. It seems to me that that was a ridiculous claim, but nevertheless they made it, and they claimed that some Federal court in Montana had held to that effect.

Mr. KENNEDY. In other words, they were entitled to all the water in order that they might get enough fish?

Mr. JONES. No; they went so far as to claim that they were entitled to it for irrigation. They claimed that the treaty gave them the exclusive right to fish in the river, and they claimed that the judge in Montana had made a decision to that effect, but we found this decision that made it entirely different from this treaty. But they were only two methods by which they could get water for irrigation. One was under the riparian rights, and then they could not irrigate with it because the man below was entitled to have it come down undiminished. The other was on the doctrine of prior appropriation, and under that they had made an appropriation which they could probably reasonably establish to the extent of 147 cubic feet of water per second of time.

Now, they have recognized the rights of the Indians to that 147 cubic feet per second of time; and that limited the water—that limited the development on that reservation. Then if the reclamation service found that they could have a project that would cover the land, the question was how could they deal with it under the reclamation act, which required them to sell water to homesteaders. The Indians are not homesteaders; and further, the Government would not want to enter into a contract with Indians to furnish water to them, because they would not have any assurance that they would get their pay, or anything of the kind, and it was suggested that if the allotted land of the Indians—and about all the land has been allotted—could be disposed of so that it could be availed of by people who could avail themselves of the reclamation act, the land could all be reclaimed, the right of the Indians to the land already appropriated would be recognized, and while there is probably no official recognition on file in the office out in Yakima County, the people who made this agreement based it on the two reports, and the amount of the claims to water rights will amount to the low water flow of the stream, less 147 cubic feet, so that the Indians are sure of that, and this bill then simply provided (and the Secretary of the Interior agreed that that was the best way to provide for the reclamation of these lands, and they ought to be reclaimed, and the Commissioner of the Indian Office agreed with him), that those Indians could sell 60 acres of their 80-acre allotments to a person entitled to take water under the reclamation act, and further that the lands would have to pay which were benefited, instead of the tribal funds of the whole tribe of Indians getting that money and some of the Indians getting the benefit and some not, which made it perfectly fair to the Indians; and they would still have the water rights for their 20 acres which they had left, and that put the Indian Office in a situation to absolutely insure irrigation.

It was suggested by the Commissioner, first, that they should take money and go up into the mountains and store water, or that there should be some provision by which the Reclamation Service would furnish water. I could not see, and the legal officers of the Department could not see, how the Reclamation Service could enter into a

contract to furnish so much water in bulk to the Indians as a tribe, and furthermore, it did not seem to me fair to take the tribal funds to furnish water for individual allottees' lands, and that had not struck the Indian Commissioner before, but it seemed to strike him that it was hardly the fair thing to do; but the fair thing to do was that these individual lands which would be made immensely valuable by the furnishing of water when the irrigation should be made, should bear the cost of the irrigation. Hence this proposition was worked out as it was, so that the Department considered that by the passage of the bill as we passed it here, with the recognition of 147 cubic feet as the amount which was actually diverted, a proper method had been provided for the settling of the rights.

The CHAIRMAN. A nonrecognition of the 147 cubic feet, you mean?

Mr. JONES. Oh, no. There probably was not anything said about it, and yet it is in all the petitions and all the reports.

The CHAIRMAN. But it is not binding.

Mr. JONES. It is not placed of record, of course.

The CHAIRMAN. Of course this is not important, but it seems to me that while your legislation is entirely proper and wise and well drawn, I have no doubt it relates simply to the question of how you irrigate some Indian lands.

Mr. JONES. That is certainly true.

The CHAIRMAN. So as to make it a reclamation project?

Mr. JONES. There is no record of the water right to the Indians.

The CHAIRMAN. But beyond that it certainly would have been a benefit to the Reclamation Service where it undertook that project to have 147 cubic feet of water rights adjudged and settled as its foundation right in the stream, to be added to by storage, rather than to be left in the position that it now is in and have no right, no settled record right, on a stream that has been adjudicated.

Mr. JONES. How could you add to that by storage under the reclamation act and furnish water to an Indian tribe?

The CHAIRMAN. Having bought in this canal under the Reclamation Service, that canal and the lands under it being entitled to so much water, you would simply go on with the extension of the canal and irrigate 100,000 acres more, and you would simply add to your water right, and that is what you would do on this reservation.

Mr. JONES. I can not agree with you on that.

The CHAIRMAN. There is no reason, because this belongs to the red man, why you could not and should not do the same thing as if the land belonged to the white man.

Mr. JONES. This canal is a tribal canal, built with tribal funds.

The CHAIRMAN. I understand that, but the question of who built it and whose money was used can not affect the question as to where the right to the water has finally got to be, and that is in the portion of the land that is irrigated, no matter who owns it.

Mr. JONES. Now, while there is not any formal written agreement signed by the Commissioner of the Indian Office or the Secretary of the Interior, they can do it to-morrow, and it is entirely in their power.

The CHAIRMAN. That was the question, whether on a stream that is adjudicated and of record you can afterwards come in and set up a claim to 147 cubic feet of water?

Mr. JONES. When that claim is out? All the people entitled to water in the stream have agreed that their right is so and so, and 147 cubic feet is left; and they can not make any claim to that. The reclamation service recommends that.

The CHAIRMAN. Is that generally understood to be an adjudication of the low-water flow of the river? It is not in any way set forth in your record of your final adjudication.

Mr. JONES. This final adjudication did not purport to adjudicate anything except the water rights of these individuals, each one of them getting so much, and the aggregate amount was the low-water flow less 147 cubic feet, which the reclamation service recognized belonged to the Indians. These people in making their agreements all understood that that belonged to the Indians, so that there can be no question about that.

The CHAIRMAN. I am sorry we have taken up so much of your time with this discussion, Mr. Henny.

Mr. HENNY. I am glad to have you bring it up, because I would feel a little easier if we had a contract with the Indian Office, which we do not. I would say in these proceedings we furnished the people in the Yakima Valley a list showing the low-water flow, including the Indian canal, and that they diverted there 147 cubic feet, and the Sunnyside was 650 feet, and that they were to leave these alone, and the rest they could divide as they thought best.

As to the Indian matter, as I stated, there is no contract; it is all at the discretion and with the authority of the Secretary. But it will be necessary to follow this matter up by some appropriation so that we can begin to improve this land for summer irrigation, as the reports and recommendations have been made to that effect.

Mr. KENNEDY. When you speak of an appropriation, you mean the setting aside of so much money by the Secretary of the Interior?

Mr. HENNY. Yes, sir; out of the fund; not a Congressional appropriation.

The CHAIRMAN. I do not understand that you have taken over this Indian irrigation system, have you?

Mr. HENNY. No, sir; I did not understand it myself until I got a letter from the local engineer at North Yakima, who says that Mr. Lynch, the Indian agent, has received orders from Mr. Larrabee, the Acting Indian Commissioner, I believe, not to touch any more of the canals, or spend any money, because this bill has passed, and it has gone into the Reclamation Service. Now, that is not the way I understood it. I do not believe that the bill has that effect.

The CHAIRMAN. Surely they are not going to load up the reclamation service with the cost of irrigating those Indian lands this summer?

Mr. HENNY. No, sir.

The CHAIRMAN. Would not that seem to indicate that is what they had in their minds?

Mr. HENNY. I do not know what they have in their minds. I only know that we keep our hands off until we see a programme ahead of us, and can make our deal with the Indian Office, and say we will take those lands over and irrigate so much land.

The CHAIRMAN. You have made no contract with them? You have simply a permission to do it?

Mr. HENNY. Yes; and more than that, the permission is still dependent on the signing by the individual Indian for the disposal of three-fourths of his individual land.

The CHAIRMAN. That might or might not be worked out in the next ten years.

Mr. HENNY. But we hope to get it worked out immediately.

The CHAIRMAN. Yes; of course.

Mr. HENNY. It is fully understood by all.

The CHAIRMAN. I just want right here to express the hope that the reclamation service will not spend its money in irrigating the farms of the noble Red until they are sure that they have the lands.

Mr. REEDER. Suppose the law is carried out by the signing of the contracts—the resignation of these 60-acre tracts will put them in such a shape that they can hold them for the pay?

Mr. HENNY. They are to pay to the reclamation fund out of the proceeds of the purchase.

Mr. REEDER. I see.

The CHAIRMAN. Do you know how much they have spent on these projects; how much they are likely to take?

Mr. HENNY. They have spent \$125,000 on the present canals and headgates.

The CHAIRMAN. Do you understand that that is perhaps what it would cost to—

Mr. HENNY. To irrigate all the lands?

The CHAIRMAN. To put them in as they now stand?

Mr. HENNY. Yes; that work was well and economically done. The canals are good and the headgates are good.

The CHAIRMAN. And the major portion of the work could be utilized in the projects?

Mr. HENNY. Yes; it would be enlarging those canals. The laterals are well laid out. This was without any passing over to the tribal fund, as I understand it, but it would simply cause the irrigation fund to be depleted by that \$125,000, and the Indians would get the benefit of it.

The CHAIRMAN. I presume that it follows as a matter of book-keeping in the Indian Department, although it is not in this bill, that the payment for those canals would be simply a matter of credit to the Indians, to be drawn upon for the irrigation of their lands?

Mr. JONES. No; I think Mr. Henny was a little mistaken. (The bill provides that whatever cost the Secretary should consider reasonable shall be paid to the Indians for this canal out of the proceeds from time to time as they come in from the disposal of water rights. The money will be paid back to the tribal fund, but it will be paid out of the receipts from the water rights.

Mr. HENNY. Yes; I was mistaken.

The CHAIRMAN. I recall the language of the bill, now.

Mr. HENNY. I think, Mr. Chairman, I have pretty well covered the Yakima situation. There is the Ledbetter, or as we prefer to call it, the Benton project, from the name of the county. Ledbetter made a failure there.

The CHAIRMAN. What did he start out to do there?

Mr. HENNY. He built several disconnected pieces of a large canal several years ago.

The CHAIRMAN. He had this project in his mind that you have mapped out here?

Mr. HENNY. Yes. It has been called the Ledbetter project from Ledbetter. I do not like the name. It was adopted long before I came into the service, and we will change it by and by.

Mr. JONES. He never ran any water into the canals?

Mr. HENNY. No. He built the easy portions of the canal, and let it go at that. That will cost \$7,000,000 or thereabouts. It is a magnificent project, and I have not the slightest doubt will be a success. Land in Kennewick sells for from \$300 to \$500 an acre.

The CHAIRMAN. What is the extent of it?

Mr. HENNY. One hundred and seventy-five thousand acres, all told. It may run up to 180,000 acres, depending on the amount of pumping done.

The CHAIRMAN. Is there any waste land in it?

Mr. HENNY. No; that is excluded. There is considerable waste land near the Columbia River, but that is deducted from this amount.

Mr. JONES. Your 175,000 acres is good land?

Mr. HENNY. Yes; it is good land. Unfortunately at the present time there is a private enterprise that is undertaking to irrigate a portion of the land. I say unfortunately because I am afraid they are not going to have a good proposition, but they may call upon us to restore public lands along the Columbia River for a considerable way.

The CHAIRMAN. Where is that?

Mr. HENNY. You see Priest Rapids, and at the power house just north of the river, and opposite that is the place where they propose to construct their power house and generate electricity and carry it down to the river, and pump with it some 75 feet.

The CHAIRMAN. They propose to irrigate by pumping exclusively?

Mr. HENNY. Yes; and then they will have their canal running all the way down the Columbia River, and probably cut out 50,000 or 60,000 acres.

The CHAIRMAN. On the north side?

Mr. HENNY. No; that would be principally below the bend on the left-hand or west side.

The CHAIRMAN. What is this line designated as the Priest Rapids gravity?

Mr. HENNY. That is a canal that was contemplated in connection with the reclamation of Priest Rapids project. That was worked out definitely while the water agreements in the Yakima Valley were pending, and while it was necessary to have immediately available a secondary project. That contemplated taking water at the head of Priest Rapids on the east side of the river, and carrying it to the power house marked there to develop power, and then continuing it by gravity and carrying it by a bridge across the Columbia River, and then through this canal that is marked "Priest Rapids Gravity Canal," to irrigate the 50,000 acres along the Columbia River. That project panned out very well, but now that the Yakima project has been approved there will be no money for such a project for many years.

The CHAIRMAN. Can you get storage on the Yakima for this great area?

Mr. HENNY. Yes ; there is storage, Mr. Chairman, for about 350,000 or 400,000 acres additional irrigation, depending on how high we ultimately make the dams.

Mr. REEDER. Is there water there?

Mr. HENNY. As I stated, there are two lakes, which will both be filled before January, and Lake Clealum can be filled one and a half times a year, and it depends on the Cascade Mountains, and the run-off from them is very steady.

Mr. JONES. About 650,000 acre-feet passes the Yakima every year.

Mr. REEDER. There is plenty of water?

Mr. JONES. They only store about one-fifth of it.

Mr. REEDER. I thought that I asked you, and you said that the land was in excess of the water.

Mr. HENNY. Yes; in excess of economical storage supply. If that land is taken in such a way as to cut our Ledbetter project to pieces it will increase the acreage charge, as it is a very expensive canal that we have to build, and we had just as well make that a good and feasible project.

The CHAIRMAN. In what way will the pumping on the north side of the river affect your project on the south side of the river?

Mr. HENNY. The pumping is to be done on the south side.

The CHAIRMAN. You do not show their proposed power-house canal on the map?

Mr. HENNY. No, sir; we do not know just where it is located; but we will be up to the question before many weeks as to the land withdrawn from the Ledbetter project.

The CHAIRMAN. Your Priest Rapids project, is that a gravity project, any portion of it?

Mr. HENNY. Yes; it would contemplate a power canal to the power house, and then most of the water will be there dropped in order to develop power. A portion of it would go on by gravity for use on the north side of the river, and the balance of it would be dropped in order to develop power by direct pumping to upper lands above this gravity canal, and if that scheme were to be connected with carrying water across the Columbia River to lands west of the Columbia River a large amount of water would continue from the power house on the same grade, cross the Columbia River, and reach the land at about where this canal line is indicated, and irrigate about 50,000 acres.

The CHAIRMAN. Will you pass now to the Oregon projects?

Mr. HENNY. Yes. The time is getting short. I do not believe it is worth while to touch on the Malheur project. It is practically abandoned. The committee got off there at the station east of Ontario and drove to Ontario. That project did not look very well, and the settlers themselves were not at all sanguine about it, and finally we took up this Umatilla project and took it up to the Secretary of the Interior, and he finally decided the matter by approving the Umatilla project.

The CHAIRMAN. In the meantime they are extending their irrigated area somewhat on the Malheur project about Ontario?

Mr. HENNY. Yes. There are two or three private enterprises that are very anxious to go in there. I think private enterprises will get in there. They have already applied to us for making restorations.

The CHAIRMAN. You think they may be able to work out some private enterprise there pretty well?

Mr. HENNY. Yes; to some extent they may succeed. Some of those projects do not look very attractive to me, but they may be successful to a certain extent.

Mr. COOPER. How many acres are there in the Umatilla project?

Mr. HENNY. In the Umatilla project there will be from 22,000 to 24,000 acres; practically the same size as the Tieton.

Mr. COOPER. How much will that cost?

Mr. HENNY. That will make a cost of about \$60 an acre. You will note that all our projects are high-priced projects, and yet I think they are more sure to return money to the reclamation fund than the lower-priced ones.

The CHAIRMAN. Is there any question about the sufficiency of the water?

Mr. HENNY. No; I think not. We have made specifications for a 300 second-foot canal to take the water at the diversion site. That blue line on the map indicates the location of this feed canal, about 25 miles in length, and discharging into the Cold Springs reservoir.

The CHAIRMAN. That feed canal is also an irrigation canal, is it not?

Mr. HENNY. No; it is put at a high elevation so as to discharge into the reservoir even when the water is extremely high. When we can not divert any water out of the river it is necessary to draw from the reservoir, so that lower ditches will have to be located below low water in the reservoir, and below those ditches the irrigated land will lie, so that we do not use this canal for anything except as a feed canal into the reservoir.

The CHAIRMAN. You have not located your canals?

Mr. HENNY. The lateral canals are not located. The topographical survey of the lands will be complete inside of a month.

The CHAIRMAN. Will the lateral waters all flow from the reservoir site?

Mr. HENNY. Yes; and they will branch out in two directions—one to the left and one to the right.

The CHAIRMAN. Your main lateral canal, then, I assume, will parallel your feed canal and run in the opposite direction?

Mr. HENNY. Yes; and about 60 feet below.

In this project virtually the cost here is divided into about three equal parts. The feed canal takes about one-third of it, and then there is this big earth dam 90 feet high at the Cold Springs reservoir which will take one-third, and then the distribution system will cost about the other third.

The CHAIRMAN. What is your storage capacity there?

Mr. HENNY. About 50,000 acre-feet.

The CHAIRMAN. How many acres did you say you irrigated here [indicating on map]?

Mr. HENNY. Twenty-two thousand acres.

The CHAIRMAN. About how much of that is partially irrigated now, if at all?

Mr. HENNY. Very little; practically none.

The CHAIRMAN. There is some irrigation, is there, along the Umatilla?

Mr. HENNY. Yes; there is considerable within this district that has been started by the Maxwell Irrigation Company, controlling a very large portion of the land, but that is so-called flood irrigation. Those people have neither any claim to the lower summer flow of the river nor have they any storage facilities, so that they are dependent on the fluctuation of the stream, so that by the 1st of July they are cut off from all water, and the country is very hot and they have a hard time getting started.

The CHAIRMAN. The Umatilla is a stream with considerable perennial flow?

Mr. HENNY. Yes; it is a stream that fluctuates very greatly between the flood and low water. The flood will run as high as 8,000 or 9,000 second-feet, but ordinarily does not exceed 4,000 second-feet. It climbs up in the winter and early spring and fluctuates up and down and then cuts right down about the middle of June or the 1st of July. You passed through this on the train going from Ontario. Probably you went through there at night.

The CHAIRMAN. You are prepared now to enter into a contract for this work, are you?

Mr. HENNY. Yes; the specifications have been submitted to the chief engineer for a dam, and also for a feed canal. Within two months I hope to have all the specifications of the lateral system completed. We were in hopes to commence the irrigating there in 1907, but various delays in having the specifications looked through, and probable delays in having the contracts approved by the Secretary, make it look like a hopeless case.

The CHAIRMAN. What is the character of that land?

Mr. HENNY. The land is rolling, and there is no hard pan there. Here and there there is rock. That has been classed out as scab land, but it is land of the very best quality for the production of small fruits. There is land similar to that to the west of Umatilla under irrigation in a private enterprise, and that indicates a remarkable fertility of the land.

Now, as to the subject which you asked me about in connection with the Okanogan project. Similar land near Lewiston is held in tracts of from 4 to 5 acres, and the people are getting wealthy and building themselves fine houses. Lewiston is at an elevation of 500 to 600 feet, and if a man attempts to hold 60 acres he will be land poor unless he is a capitalist.

The CHAIRMAN. There was no one thing so thoroughly impressed upon my mind during our trip last summer as the fact that the man who had the smallest acreage was the man who seemed generally to be making the most money.

Mr. HENNY. That is right.

The CHAIRMAN. Not only the most money per acre, but as a matter of fact the men who were the most prosperous and seemed to be accumulating the most rapidly were the men with the comparatively small holdings, and when I asked a man in Colorado, at Grand Junction, about an old friend of mine who went there twenty years ago, he said that he went the way of all the other people who came there years ago and got a great deal of land—he went broke. The prosperous people that we found were the men with from 10 to 40 acres. Here and there, of course, a man with a considerable amount of land

and an extra amount of energy would take care of a larger acreage fairly well.

Mr. HENNY. Near the town of north Yakima, by natural subdivision the farms are about 15 acres. At Lewiston they have been subdivided into farms of 5 acres. That is all they can take care of in a proper way; raising vegetables and strawberries and planting orchards.

The CHAIRMAN. We are contemplating legislation, and we will have the committee pass upon it as soon as we can get a quorum, that will allow the subdivision of lands.

Mr. HENNY. I so understood, and I made free to bring this matter up in connection with this project, because, if anywhere in the Reclamation Service, this is the place where the subdivision may mean the immediate as against the distant success of the project.

The CHAIRMAN. How much of that land is in public ownership?

Mr. HENNY. The situation is very complicated. There are any number of people who have desert claims, in connection with these flood irrigation projects under which they were going to prove up. The only way we could get in there at all was to allow those people to retain 160 acres. That is a very large amount. There was no other way out of it. The other 160 acres that is to be relinquished has to come under a 40-acre limit. That is the smallest under the present law. The Maxwell Irrigation Company whose canal we buy out in this bill, control and own about 5,000 acres. They have to subdivide and sell that out in 40-acre tracts, so that 160-acre units will be confined to possibly a dozen or twenty desert entries, but all in excess of what these desert entries have is to be subdivided into 40 acres.

The CHAIRMAN. It is too bad. They are at liberty, of course, to subdivide themselves?

• Mr. HENNY. Yes.

The CHAIRMAN. If they are wise they will sell out and further subdivide at what will be a very nice profit to them.

Mr. HENNY. The tendency is to hold that land longer, to let it appreciate by the development of the adjoining land; but as a rule it holds the whole project back, and under this project there will be three-fourths of it subdivided into 40-acre farms, and that certainly ought not to be divided into more than 20-acre farms, and probably not more than 10 acres.

The CHAIRMAN. How does this land lie; is it reasonably unbroken and compact?

Mr. HENNY. It is rolling. It lies nicely for orchards. On the map it looks pretty rough, but you can drive all over it.

The CHAIRMAN. There is no considerable area of waste land?

Mr. HENNY. There is right along the Columbia River; there is some scab land. But we have counted that out completely. The principal body of it is fine land. The bad land is not scattered through it. It is in the high places.

The CHAIRMAN. This is the only project you have now ready for construction in Oregon under your management?

Mr. HENNY. Yes. There are of course some attractive projects throughout Oregon, but it does not seem as though for a couple of years we would have any money to spend there.

The CHAIRMAN. Is there anything more that the members of the committee want to make inquiry in regard to relative to this project?

If not, unless there is something you want to add to the statement you have made, Mr. Henny, we have finished, and we have only to thank you very much for your very interesting and lucid statement.

Mr. HENNY. I only wish to thank you for your great patience in listening to my statement.

The CHAIRMAN. It has been very interesting and very clear, and we wish to thank you for the information that you have given the committee.

(Adjourned.)

COMMITTEE ON IRRIGATION OF ARID LANDS,
HOUSE OF REPRESENTATIVES,
Monday, April 30, 1906.

The committee this day met, Hon. Frank W. Mondell in the chair.

STATEMENT OF MR. F. H. NEWELL, CHIEF ENGINEER, RECLAMATION SERVICE—Continued.

The CHAIRMAN. We will be glad to hear from you, Mr. Newell, further in regard to the work in the engineering districts which have not been already covered by the hearings. Nevada, New Mexico, Oklahoma, Texas, Nebraska, and South Dakota, I think, are those we have not covered.

Mr. NEWELL. The three districts which have not been discussed are the Nebraska-South Dakota-Wyoming district, under Charles E. Wells; Nevada, under L. H. Taylor, and New Mexico-Oklahoma-Texas, under B. M. Hall.

Taking up the work first in Nebraska and southern Wyoming, it is there confined largely to the storage of the waters of North Platte River at the Pathfinder dam site. This stored water is to be released into the North Platte and be used for irrigating lands at various points along the river in Wyoming and adjacent parts of Nebraska. The work on the Pathfinder dam has advanced to a point where the sluicing tunnel has been completed and the contract let for the main dam. The contractor is having some trouble at the present time with high water and is considerably behind on his contract, but conditions are otherwise favorable for doing good work.

The CHAIRMAN. There has been very unusual and unusually early high water there?

Mr. NEWELL. Yes, sir. Throughout the country there have been extraordinary floods this winter. Further east the first and most important diversion at present will be in eastern Wyoming through what is known as the Whalen Falls canal, the right of way through which was obtained from Mr. Lingle. That canal has been enlarged and every effort made to complete it to a point where the water can be put through it early in May. The contractors as a whole are doing fairly well, although some of them have not yet finished their work.

The CHAIRMAN. Under that canal it became necessary, as I understand, for you to make a supplemental contract in order to get the water on the land earlier than was provided for in your original contract, and that supplemental contract, as I understand, calls for a considerable additional expenditure. How did that occur? Did

not your original contract provide for water early enough to meet your contracts with the Lingle people?

Mr. NEWELL. The contract with the Lingle people provided that if they would give us a right of way through the canal that we would deliver water to the land under the canal during the irrigating season of 1906. At the time the contract was made it was fully explained, and, I think, understood by the land board of Wyoming and by our engineers that it would not be possible to finish the canal at the beginning of the season, but that water would be delivered sometime during that season. That understanding is supported by the statement of the State land officials.

The CHAIRMAN. That was their understanding?

Mr. NEWELL. Yes, sir; and was our understanding and is now our understanding. At a later time the question came up as to the interpretation of the word "during." We contended it had the usual dictionary meaning—that is to say, sometime within a stated period, but a ruling was made to the effect that "during" in that connection meant at the beginning of, and hence we were instructed to expedite the construction of the work so that the water would be delivered at the beginning of the irrigating season rather than at sometime within the irrigating season. That necessitated, of course, additional equipment and an enormous increase of work at an unfavorable time of the year, so that the contractors were, after negotiations, given a bonus if they would complete the work at that time.

The CHAIRMAN. A bonus in the form of an additional amount per yard?

Mr. NEWELL. Yes, sir; a few more cents per yard if they would finish that work by the 1st of May. The amount paid in addition is probably no larger than would have been paid if we had made the first contract to be completed on the 1st of May.

The CHAIRMAN. You think then that had you originally asked for bids for the completion of the work by the 1st of May the price would probably have been as high per yard as the original contract price plus the additional sum you have paid?

Mr. NEWELL. Unquestionably we would have had to pay as much and possibly a little more, because the first contract was let at a low price and the additional compensation given for time is not much more than would be a fair amount considering the increase in wages and the cost of subsistence. The extra amount which we shall pay we do not consider as more than a fair charge to the contractors for the trouble they have been to in hastening the work.

Mr. KENNEDY. That is the supplemental contract referred to by the chairman?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. Does that require an earlier completion of only so much of the work as is necessary in order to enable you to begin the contract with the Lingle people?

Mr. NEWELL. Yes, sir; we will put in at a few places temporary structures so as to get water down to this land in the quantity which the land requires. It will probably not require much water because the season has been somewhat wet. The anticipation of early disposition of the lands and settling them by the company has not been wholly fulfilled. They were very anxious to get the water, but now *they have it in sight* there is not the same anxiety there was at one

time. The work has progressed favorably. The water will be turned into a portion of the canal shortly, and permanent structures of concrete can be put in during the summer without disturbing the temporary flumes which have been built.

The CHAIRMAN. The headworks through which you are diverting the water from the river are only temporary?

NEWELL. At the present time; yes, sir.

The CHAIRMAN. You have not done anything toward the permanent headworks?

Mr. NEWELL. Only in part. We have only put in sufficient material to get the water out on the land and have deferred all permanent work so as to put it in under good conditions of climate and low water.

Mr. KENNEDY. The storage site and the headworks are entirely in Wyoming?

Mr. NEWELL. Yes, sir; storage is at the locality known as the Pathfinder site, about 40 miles above Casper, Wyo., and is reached by wagon road. We built a bridge across the river in order to expedite the hauling of material.

Mr. KENNEDY. What is the extent of the site?

Mr. NEWELL. The flooded area above the Pathfinder dam is, in round numbers, about 23,000 acres. Some of it is public land and some of it is in private ownership. Some of it has been well cultivated. Purchase has been made of most of the farms in that site, but in one or two instances the owners are holding out for a little higher price.

The CHAIRMAN. What is the length of the interstate canal now under construction?

Mr. NEWELL. There are two series of contracts. The first is for the first 45 miles and that is practically completed. The next is for 50 miles and that is being pushed forward, but the same contractors having work on the first section of 45 miles are holding back the second section in order to transfer their teams and equipment from the head to the foot as soon as they finish at the head. We have been urging them to finish the head and let the rest come later.

The CHAIRMAN. You probably could not get your structures in condition and pour canal set up in good shape to carry water farther than the first series of contracts for a year or so any way?

Mr. NEWELL. We hope to get the water down to the extreme end during the present season.

The CHAIRMAN. The extreme end of the first contract?

Mr. NEWELL. Of the 95 miles. There is a large enough force now on the ground working at the rate they are now working and under more favorable circumstances to push it all through. It is comparatively simple work after leaving the first 20 miles.

The CHAIRMAN. Is that probably the ultimate extension of the canal line?

Mr. NEWELL. It is not the ultimate extension as regards the quantity of water or land. There are certain canals which exist, notably the Farmers' Canal, which may modify the future development. We can go on indefinitely down the North Platte River, or stop at the end of the 95 miles.

The CHAIRMAN. You are down to a point now where the land below could either be covered by a Government canal or by the Farmers' Canal?

Mr. NEWELL. Yes, sir; the Farmers' Canal reaches out practically to the foothills and it is a question as to whether Mr. Leavitt has exclusive right to irrigate the land below.

The CHAIRMAN. Have you been able to maintain your grades, that entire 95 miles, or have you been compelled to drop?

Mr. NEWELL. We have been able to maintain the grade.

Mr. KENNEDY. What portion of the 95 miles is in Wyoming and what portion is in Nebraska?

Mr. NEWELL. About 54 miles are in Wyoming and 41 miles in Nebraska.

Mr. KENNEDY. The controversy between the Farmers' Canal Company and the Government is in litigation?

Mr. NEWELL. Yes, sir. The development is proceeding very rapidly. The public lands have all been taken up and there are demands for far more lands than can be supplied, but the Secretary has not yet set any farm units and nearly all the entries are 160 acres. Some of the people who have taken up 160-acre tracts protest against being cut down to 80 or 40 acres, and have been corresponding about the subject, but it is believed to be best for all interests to cut the 160 acre tracts to 80 acres.

Mr. KENNEDY. Is there any question about the power of the Secretary to do that?

Mr. NEWELL. None whatever, in the opinion of the Department. The law specifically states that he shall, or may, do it after he has let the contract and has determined the area which "may be reasonably required for the support of a family upon the lands in question."

The CHAIRMAN. I think the law is very clear on that subject. It was intended to be clear, and I think it is.

Mr. KENNEDY. Then when the time arises, the settlers will have to relinquish?

Mr. NEWELL. Yes, sir. The conditions are these: Very few men can make a living on 160 acres of land every acre of which is irrigated, because of the extreme cost of irrigating the land and the cost of labor. On the other hand more men have succeeded on 40 acres than on 80 acres, and I think that the raising of sugar beets and similar intensified farming is going to be the source of great wealth.

Mr. KENNEDY. Speaking particularly of Nebraska, what crops do you regard most important under irrigation, in addition to sugar beets?

Mr. NEWELL. Farm crops for the support of the family, and special industries that are difficult to anticipate.

Mr. KENNEDY. For instance, how about celery?

Mr. NEWELL. That belongs to the class I mean of special industries, watermelons, strawberries, and new crops which must be tried.

The CHAIRMAN. Is it not true that on most of these tracts, and particularly of that region, that the first sure and safe crop, and the crop from which the farmer quickly realizes, is alfalfa or grain, and from that class of products which furnish him an immediate support and a source of income he will gradually develop into the special class of products?

Mr. NEWELL. Yes, sir; nearly all the farmers are starting with the idea of putting in alfalfa or some of the common grains. They put it in alfalfa and then turn it under and cultivate the soil for some

other crop, but the men who are trying to hold 160 acres are almost without exception doing it, not with the idea of cultivating all the land themselves, but for the purpose of relinquishing a part to some other man. An argument used in favor of this relinquishment is that by selling the relinquishment the seller remains in the country with capital to get started. The argument against such sales is that the new comer has to carry the burden of the cost of the relinquishment. We believe that success will be promoted by making the farm unit as small as possible and getting in as many people as can find homes. We can not make the unit so small that the land will not be taken. There are about ten applicants for every 40-acre tract. With a large number of people there is more chance of success and a larger attempt at cultivation than with a few large farmers.

The CHAIRMAN. Unquestionably in nine out of ten cases they would have less difficulty in paying for their water right with a small acreage than with a large one?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. It is true in the North Platte territory with the irrigation they have had that they have found the soil is suited for celery and strawberries and these high-priced products.

Mr. NEWELL. By careful experimentation the farmers have found localities that are very desirable for such products.

Mr. KENNEDY. I wish you would tell me in a general way about how many acres are suited to those products in Nebraska, speaking now with reference to the soil naturally suited to them and without reference to the controversy with the farmers' company.

Mr. NEWELL. There are from 60,000 to 100,000 acres on the north side of the river which will be covered by the present canal system.

Mr. KENNEDY. Could you tell, in a general way, within what counties that land lies?

Mr. NEWELL. It is in Sioux County and Scottsbluff County, Nebr. The point I wish to make particularly regarding the subdivision of units is that if we should permit men to hold 160 acres and they should not be able to dispose of it as rapidly as necessary they will inevitably come to Congress for relief to help the "poor farmer" to hold 160 acres until he can sell some of this land at an advance. I think the greatest safeguard is to subdivide the land into small tracts, because there will be less failures.

Mr. KENNEDY. In other words, you think the farmers with too large holdings will find themselves land poor?

Mr. NEWELL. Yes, sir. The experience throughout the whole United States has shown that the most successful irrigators are those who have less than 30 acres and who are actually cultivating it, while the men who have failed at irrigation have almost inevitably been the men who have tried to water and cultivate 160 acres.

The CHAIRMAN. I think you are absolutely right in beginning the farm units small, and that is not only in the interest of the development of the country generally, but in the interest of the individual farmer. I believe that the average farmer will make more dollars on 40 acres than he will on more land.

Mr. KENNEDY. My farming experience leads me to the same conclusion.

The CHAIRMAN. One of the subprojects, if I may use that term, of the North Platte project is the so-called Goshen Hole project.

As I understand, you have been unable to find bed rock near the surface in the vicinity of Guernsey to furnish the foundations for a dam at that point for the diversion?

Mr. NEWELL. Yes, sir. The big storage dam at the Pathfinder site will hold more water than is required for the North Platte interstate canal, and if the entire cost of the storage work was charged to the interstate canal the cost of irrigation would be almost prohibitory. In making plans, therefore, it was assumed that a part of the cost of that storage work would be distributed over Goshen Hole project and upon other lands which might be reached on the south side of the river in Nebraska and on both sides of the river below the dam. Each of these projects diverting water in the vicinity of Casper or Douglas or Goshen Hole is more expensive than the north side interstate canal. The diversion to the Goshen Hole must be made by a high dam at Guernsey, and, it is probable, must be constructed of loose work.

The CHAIRMAN. That is entirely practicable?

Mr. NEWELL. It is apparently practicable at that point, because there is an enormous amount of rock which can be used at a very small expense for making a rock fill in the canyon to divert the river. It would not be practicable at some other point where there was not that large amount of cheap material. Assuming that we can get that cheap material it will go down by gravity to the dam site and would make a very cheap dam. One of the next things to be undertaken, assuming that funds are available, is to take up the Goshen Hole project or some similar project in order to share the expense of storage at the Pathfinder dam.

Mr. KENNEDY. What quantity of land is subject to the Goshen Hole project?

Mr. NEWELL. There are approximately 150,000 acres.

Mr. KENNEDY. How is that divided as to Wyoming and Nebraska?

Mr. NEWELL. It is all in Wyoming. The land bordering North Platte River in Nebraska can be reached as cheaply by diversion immediately at or above the State line rather than by a long canal circling the Goshen Hole and returning nearly to the river, forced back by the encircling hills.

Mr. KENNEDY. That is the land on the south of the Platte River?

Mr. NEWELL. Yes, sir.

Mr. REEDER. What is to be the expense of the Pathfinder Reservoir dam?

Mr. NEWELL. Approximately \$1,000,000.

BELLE FOURCHE PROJECT.

The next project in this division is that known as the Belle Fourche, north of the Black Hills, in South Dakota. This is a storage proposition in which the storage reservoir is not on the river, as in the case of the Pathfinder, but in a depression to the north of the river. Water must be taken in a very large flood canal heading below the town of Belle Fourche and extending to a depression on Owl Creek. There one of the largest earth structures in the country is being built. It will take at least three years to complete it.

The CHAIRMAN. Do you find it necessary to sink a trench to place the core?

Mr. NEWELL. There is no solid bed rock near the surface on which to place the core. The soil is of considerable depth and fairly uniform in character.

The CHAIRMAN. You simply place an earth dam on the earth?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. When do you expect to complete that dam?

Mr. NEWELL. The contract calls for the completion of the dam by September 1, 1909.

The CHAIRMAN. In the meantime, is there any amount of land on the inlet canal between the diversion and the reservoir that can be irrigated?

Mr. NEWELL. There is not much land there, but we can continue the diversion canal around to cover a considerable part of the land with the spring floods, and on much of the land fair crops are raised.

The CHAIRMAN. Do you propose to do that before the dam is completed?

Mr. NEWELL. Yes, sir. We will use considerable water in the system.

The CHAIRMAN. Your inlet canal is now complete?

Mr. NEWELL. It is under construction.

The CHAIRMAN. So you have not been able to utilize any water up to this time?

Mr. NEWELL. No, sir.

The CHAIRMAN. There have been pretty heavy floods coming down the Belle Fourche?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. You will irrigate some land from Belle Fourche this year?

Mr. NEWELL. We hope to get some water on it. The work there has not presented any particular complication. It is large, heavy earthwork, and has been carried on almost wholly by contract, although at the present time one of the contractors is in trouble, and we are trying to carry it along until he can adjust his affairs.

TRUCKEE-CARSON PROJECT, NEVADA.

The next large work is in Nevada—the Truckee-Carson project. That is the most advanced of any work under the reclamation act, the work having been completed to a point where certain structures are in actual service.

Mr. RAINEY. How many acres are covered by this project?

Mr. NEWELL. About 300,000 acres in all. This project is one which is capable of almost indefinite expansion, because of the opportunities for storage in the mountains in California and adjacent portions of the foothills in Nevada. The lands to be irrigated embrace over 500,000 acres of Carson desert and sink stretching up toward the Humboldt. It is simply a question of picking out the best of the land and putting it under water. The source of supply is in the Carson and in the Truckee rivers. The portion of the project already built consists of a dam on the lower Truckee River, taking the waste waters coming down from near Reno and carrying them out in a cement-lined canal across the divide to Carson River. From that stream the water is distributed on the irrigable land. The supply can be reinforced by storage at Lake Tahoe and by the storage of the floods in

Carson River and in the lower Carson, which involves a large dam yet to be constructed.

The CHAIRMAN. You contemplate a good deal of storage at Lake Tahoe?

Mr. NEWELL. The storage is such that 200,000 acre-feet can be drawn annually. That is the cheapest storage we have. At the present time we are stopped by the wealthy summer residents around the lake, who have brought injunctions against our contractor and who threaten to bring injunctions in all the county courts of the State, of which there are over 80 in number. In view of that attitude we were forced to take over the contract and cancel it, to release the contractor, and we will try to fight the controversy out in the United States courts.

The CHAIRMAN. It is simply a question there with the residents about Lake Tahoe?

Mr. NEWELL. Ostensibly, but behind it may be certain claims of the owners of the land at the outlet. We attempted to buy out the owners at a reasonable rate. They refused to sell at what we considered a reasonable rate, so we bought a piece of land adjacent to their dam with the idea of making a new outlet into Truckee River. There have been many objections raised to regulating the level of the lake, although we distinctly propose to regulate the level of the lake within the natural limits.

The CHAIRMAN. You do not attempt lowering the lake lower than it goes now?

Mr. NEWELL. No; or raising it above the former high-water levels.

The CHAIRMAN. I do not understand how anyone could be injured.

Mr. NEWELL. It is very difficult for anyone to understand it who is not a party to the suit. It seems to us as a vexatious piece of litigation started for an ulterior purpose. If possible we hope to get the matter into the United States courts and have it tried on the merits.

The CHAIRMAN. What are you doing in the way of irrigation now under this project?

Mr. NEWELL. There are now 20,000 acres under irrigation and in a short time there will be upwards of 100,000 acres. That is in the vicinity of Fallon, and is the delta country of the old Carson River. The river has been straightened and the water caused to flow down a single channel from which it will go north into Carson sink. It will be kept out of Carson Lake, so that the lake will recede, leaving the marshy land on its border available for cultivation.

The CHAIRMAN. Is the lower Carson reservoir site upon a lake?

Mr. NEWELL. No, sir; a valley which we purchased.

The CHAIRMAN. The conditions are reasonably satisfactory there, from the standpoint of the service?

Mr. NEWELL. They are quite satisfactory. We have a large area of land to select from—some good, some indifferent, and some bad.

The CHAIRMAN. Is all the irrigated land filed upon?

Mr. NEWELL. Yes, sir. There are a number of farm units still open to entry, but there has been some misunderstanding that has caused some delay in taking up the farm units.

The CHAIRMAN. What is the unit there?

Mr. NEWELL. As a rule it is 80 acres, but in some places it is 40, and in some 120 acres.

The CHAIRMAN. Has there been any considerable amount of opposition to the reduction of entries?

Mr. NEWELL. No general opposition on the part of the people. Some have not understood the regulations and have simply refused to modify the original entries.

The CHAIRMAN. The land office for this district is at Carson City?

Mr. NEWELL. Yes, sir. It is unfortunate because it requires two days' travel to go from the irrigated lands to the land office. Attempts have been made to have the land office moved to a more accessible point.

Mr. KENNEDY. It is two days' travel by rail, do you mean?

Mr. NEWELL. Yes, sir. To get from Fallon, the center of the irrigated district, around to Carson City requires a two days' trip.

Mr. KENNEDY. Two days each way.

Mr. NEWELL. Yes, sir. As a whole, the project is very encouraging. The public land is being cultivated rapidly, and with the excellent markets afforded by the gold fields to the south, with which this land is connected by rail, the outlook is for the development of a wealthy agricultural community.

Mr. KENNEDY. What effect, if any, do you think the destruction of San Francisco will have on this project?

Mr. NEWELL. None that I can see. We were very anxious to know whether the structures in Nevada had been affected by the earthquake. The Southern Pacific Railroad will soon build a branch line from Hazen into Fallon, which will bring the settlers directly into the midst of the agricultural district.

NEW MEXICO, OKLAHOMA, AND TEXAS.

The next district to be described is that under Mr. B. M. Hall, in New Mexico; Oklahoma, and Texas. The work furthest advanced is on the Hondo, a tributary of the Pecos, in the vicinity of Roswell. That work is nearly done, irrigating about 10,000 acres of land. The storage dam has been completed and the distributing system is under way.

The CHAIRMAN. You will irrigate a considerable portion of that land this year?

Mr. NEWELL. Practically all of it will be put under water this year.

The CHAIRMAN. That land is mostly in private ownership?

Mr. NEWELL. Yes, sir; practically all of it. Farther south on Pecos River is Carlsbad. The old Pecos irrigating system recently destroyed by floods has been purchased and is now being rebuilt to save the orchards and crops in the vicinity of Carlsbad. That work is being pushed ahead partly by contract and partly by force account, in order to get the work finished before another season.

The CHAIRMAN. How much of a project is that?

Mr. NEWELL. That involves an expenditure of about \$600,000.

The CHAIRMAN. That covers mostly land in private ownership?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. And it is really the reinforcing and rebuilding of works already constructed?

Mr. NEWELL. Yes, sir. There is a large amount of irrigable land. If the irrigating system is extended we can bring in as much land

as there is water. One of the principal arguments for purchasing that system was that the old company had the first rights on the Pecos River and might have interfered more or less with other projects on the Pecos.

The CHAIRMAN. How much did that cost?

Mr. NEWELL. It has been agreed to pay \$150,000 for the works and property.

Mr. KENNEDY. Do you know what amount the old company had expended on the works?

Mr. NEWELL. The claimed to have expended over a million dollars. The other work in New Mexico is on the Rio Grande, and is part of a very large interstate and international system. There have been complaints from the Republic of Mexico that the old irrigation works in the vicinity of El Paso on the Mexican side have been interfered with by diversion from the Rio Grande in the United States. On the part of the United States the claim has been made by the Attorney-General that while that may be true, the water legally belonged to us in spite of any claim that might have arisen through ancient use. These controversies have increased to a point where it has been deemed wise to take up the question of erecting a large reservoir on the Rio Grande sufficient to hold all the water in the river. A place has been found about 150 miles above El Paso where all the water can be held by a large dam and water provided for 180,000 acres of land at a cost of upward of \$40 an acre, or \$7,200,000. We have not that money in sight, but the Secretary of the Interior has set aside \$200,000 to begin the work on the upper end of the Mesilla Valley above Las Cruces. This summer we propose to put in a diversion dam to restrain the Rio Grande at the head of the canals.

The CHAIRMAN. That work is permanent and will in any event be a part of the permanent work for the development of the lower Rio Grande?

Mr. NEWELL. It is an essential part of the work. In the meantime a treaty has been drawn and submitted to Mexico with a view to covering the conditions, that if the Mexicans will waive any claims they may have in the matter of the international controversy or any other rights, water will be furnished free to them for about 20,000 or 25,000 acres.

The CHAIRMAN. How is the amount of water fixed in the treaty—is there a given quantity?

Mr. NEWELL. A given quantity, 55,000 acre-feet, to be delivered in the Rio Grande at the head of the Mexican canal during certain specific months of the year or such proportion as that may bear to the amount of water in the reservoir; the remainder of the water is to be used to the extent of 110,000 acres in New Mexico, and the balance below El Paso on the Texan side of the river. New Mexico, Texas, and old Mexico will divide the water in about the proportions stated.

Mr. KENNEDY. What will be the additional expense of extending that water into Texas under the law which passed the House this session?

Mr. NEWELL. The law which relates to that particular project was signed by the President on the 25th of February, 1905. The law

which passed the House this session does not bear upon this, because it is covered by previous legislation.

Mr. KENNEDY. What relation does this project bear to the present legislation?

Mr. NEWELL. None whatever.

Mr. KENNEDY. The water does not come from this project?

Mr. NEWELL. No, sir; the legislation which is pending relates wholly to other parts of the State.

One essential of the Rio Grande project is, in my mind, that Congress shall provide the amount of money which is necessary for the equivalent of the water furnished to Mexico, namely, if we furnish water for 25,000 acres.

The CHAIRMAN. How many acre-feet will that be?

Mr. NEWELL. From 50,000 to 60,000 acre-feet.

The CHAIRMAN. What do you estimate the cost of the storage of that amount of water?

Mr. NEWELL. We estimate that an equivalent fair charge would be \$40 an acre, and on the 25,000 acres that would be \$1,000,000. As an essential preliminary we hope that Congress will appropriate \$1,000,000 specifically for that share of the work.

Mr. KENNEDY. Out of the reclamation fund?

Mr. NEWELL. No, sir; so that the reclamation fund and these people will not be called upon to pay the cost of water which is furnished to Mexico; not for their benefit, but to adjust the international comity with the two Republics.

Mr. KENNEDY. In other words, the whole people of the United States should bear this expense of a million dollars, instead of charging it to the reclamation fund?

Mr. NEWELL. That is our contention, because the reclamation fund does not get any benefit from it, and if we attempt to adjust the expense on the people there it will make the cost almost prohibitory.

The CHAIRMAN. With the present outlook it is not probable that you will have a sufficient sum available for a good long time to undertake that great enterprise in any event?

Mr. NEWELL. No, sir; the main thing at the present time is to have a definite plan looking to the future, one which will stop the complaints of the Mexicans and which will enable the development to proceed.

The CHAIRMAN. What portion of the estimated cost of the construction will be involved in the dam?

Mr. NEWELL. The dam is the most expensive part of the work, and will cost about \$5,000,000.

The CHAIRMAN. If we could secure an appropriation of a million dollars from Congress to bear the Mexican end of the burden and add another million available from the reclamation fund, you could begin the construction of the work?

Mr. NEWELL. Yes, sir; we could lay the foundation and take a long step in advance.

Mr. REEDER. If they do not see fit to settle things in that way the dam could be used to irrigate a larger amount of land on American soil, and thus get the money back?

Mr. NEWELL. Yes, sir; that would be one of the arguments used against giving any water to the Mexicans.

The CHAIRMAN. But it is true, on the other hand, that the Mexicans have a valid claim in international comity, if not in law, against us?

Mr. NEWELL. That is believed to be so. Some of our statesmen say: "We will pay any amount to Mexico in money, but we will not give them one drop of water. Water is too valuable."

Mr. REEDER. Do you think that this reservoir which can be built there will hold all the flood waters of the Rio Grande?

Mr. NEWELL. Yes, sir. If the dam had been built ten years ago, not one drop of water would have passed the dam.

Mr. KENNEDY. Really the most of the work will be fixed when this proposed treaty is made and ratified?

Mr. NEWELL. Yes, sir; the first step is to get it ratified.

Mr. REEDER. How much land could be irrigated with the reservoir holding all that water?

Mr. NEWELL. One hundred and eighty thousand acres.

Mr. KENNEDY. On American soil?

Mr. NEWELL. Either.

Mr. REEDER. There is land enough on American soil to utilize all the water?

Mr. NEWELL. Yes, sir.

Mr. KENNEDY. If Mexico is allowed water for 25,000 acres, then you could irrigate 155,000 acres of American land?

Mr. NEWELL. Yes, sir.

There is one other locality to be considered, namely, Oklahoma. This Territory has disposed of a large amount of land, and the contributions to the reclamation fund have been great. Nevertheless the opportunity for development by irrigation has been extremely difficult, because the land lies well to the east toward humid conditions and out on the plains, where the conditions for storage are poor.

It is an open rolling country, and most of the natural waters are saline or alkaline. Many of the springs are salty, but the flood waters are not notably so. The main supply must come from storage of these flood waters, which tend to become salty on storage. It has been a question as to whether we could afford to store somewhat salty water at a cost of from \$40 to \$60 an acre, to be used on land which is now valuable for farming, and where the chances are that the use of the water will ruin the land unless irrigators use it with great skill. We are pumping a small amount of the natural salty water to agricultural lands and endeavoring to get people to cultivate with the water to see whether they can raise crops successfully.

Mr. KENNEDY. The land is benefited by a certain amount of salt?

Mr. NEWELL. Yes, sir; a very small amount of earthy or alkaline salts, such as result from the decay of the rocks.

Mr. KENNEDY. And it is a question whether or not the farmers would be discreet enough so that they could use the water?

Mr. NEWELL. That is just the question. The soil is now heavily loaded with salt and alkali, and if more salt is brought in by careless irrigation the farms may be ruined.

Mr. KENNEDY. Is there any way by which the saline properties of the water could be reduced?

Mr. NEWELL. Yes, sir. There is a way by which the saline properties of the stored water can be reduced 50 per cent. We propose to isolate the larger salt springs and pump the water out of the drainage

basin above our dam site, and thus keep the stored water relatively sweet.

The CHAIRMAN. Those lands can be utilized for farming without irrigation?

Mr. NEWELL. Yes, sir. They are now producing large crops of cotton, corn, and other produce, but there are years of drought, when the crops are lost. When the rains come at favorable times, enormous crops are raised.

Mr. KENNEDY. It would not be possible on account of the expense to apply to that water the same process that is applied, for instance, on the ocean steamers in exterminating the salt from the water?

Mr. NEWELL. The expense of getting out the common salt is prohibitory for such uses.

That completes in a general way a discussion of the projects which we have now under consideration. There are in addition twenty-odd projects of secondary importance whose construction would cost some \$6,000,000.00, and which can be taken up if these first projects are successful and if the reclamation fund is increased by returns to it.

Thereupon the committee adjourned to meet to-morrow, Tuesday, May 1, 1906, at 10.30 o'clock a. m.

COMMITTEE ON IRRIGATION OF ARID LANDS,
Tuesday, May 1, 1906.

The committee this day met, Hon. Frank W. Mondell in the chair.

**STATEMENT OF MR. C. E. GRUNSKY, CONSULTING ENGINEER;
RECLAMATION SERVICE.**

The CHAIRMAN. Mr. Grunsky, you have now been operating under the reclamation law for a considerable length of time in quite an extensive way. What is the present situation and outlook with regard to the work?

Mr. GRUNSKY. I became connected with the reclamation service a year ago, and immediately upon my appointment as consulting engineer I made a very extended trip through the West, visiting the points at which the most important work was under way or in contemplation. During the first year I was expected to give particular attention to those matters which involved international complications to the situation on our northern boundary, where the question of the utilization of the waters of the St. Mary and Milk rivers was under consideration, and also to the problems on the southern boundary, Rio Grande and Colorado rivers. In visiting these localities I stopped at points where important matters were under consideration, and my time was given to the engineers of the various projects in consultation and for any other purpose which seemed desirable. In this way I became quite conversant with the work throughout the whole scope of country in which land reclamation by irrigation is now undertaken.

The CHAIRMAN. What is the present status of the international questions with regard to the Milk River project?

Mr. GRUNSKY. The question of arranging a treaty or an agreement with Canada has been under consideration, but it was also thought important to have some actual work under way, to have evidence on the ground that the United States is in earnest in the matter of utilizing the waters that flow from United States territory into Canada, and work has been authorized, as the chief engineer has undoubtedly fully explained. Plans are under consideration for work that is to be undertaken at once on St. Mary River.

The CHAIRMAN. The matter of a treaty or arrangement with Canada is still in contemplation?

Mr. GRUNSKY. That is pending.

The CHAIRMAN. And you still hope to effect some sort of an arrangement whereby the waters may flow through Canadian territory and return to the United States without being diverted in Canada—that is, a portion of the water which we claim?

Mr. GRUNSKY. Yes, sir. The people in the lower Milk River Valley have been using the water for a great many years, and of course are entitled to it. The Canadian people have constructed works on Milk River which are such that they command a superior position and they can take the water before it reaches the locality. If the water originating in the United States is put into Milk River from the St. Mary the Canadian canal would have the first opportunity to take the water and make use of it upon Canadian lands. The Canadian Canal operates under concessions granted by the Canadian Government. It is necessary to have an agreement with Canada if there is to be certainty that any water delivered into the Milk River shall actually be available for use by irrigators in the United States, and the steps taken are in the direction of perfecting the necessary agreement.

The CHAIRMAN. Is the use of water in Canada up to this time from the Milk River menacing the settlers on the lower Milk River in the United States?

Mr. GRUNSKY. Up to the last time I saw it their canal from the Milk River was not so far extended that they were utilizing its waters.

The CHAIRMAN. But they can so far extend their Milk River irrigation system as to practically use all of the present flow of the Milk River?

Mr. GRUNSKY. That is substantially the situation.

The CHAIRMAN. What you hope to accomplish by a treaty or understanding with the Canadian government, as I understand it, is for a division of the water, both as to the regular flow of Milk River and as to the return into the United States of any waters that you may turn into the Milk River from the St. Mary?

Mr. GRUNSKY. That is exactly the situation. On the St. Mary River at St. Mary Lakes is an opportunity for storing water, and water there stored can be conducted in a canal system to branches of the Milk River. There is also an opportunity of utilizing this stored water, without sending it down into the lower Milk River country, upon lands in the United States. Without being finally committed to either of the two projects, work that will be useful in either case has now been authorized.

Mr. REEDER. What per cent of the regular flow of Milk River has been utilized in the United States—the low-water flow?

Mr. GRUNSKY. The low-water flow is at times inadequate to supply the requirements of the irrigators.

Mr. REEDER. Are irrigators using water in the United States?

Mr. GRUNSKY. Yes, sir. There are times when the shortage of water in the lower Milk River country under present conditions is pronounced. It is desirable that some plan of storing the St. Mary water and carrying it through Canadian territory to the lower Milk River territory should be made feasible.

The CHAIRMAN. In case you are not ready to make satisfactory arrangements with the Canadian government, you can utilize the waters which you propose to divert to the St. Mary in the United States?

Mr. GRUNSKY. There is land on which that water is to be utilized in case such satisfactory arrangements are not made.

I was asked the question as to my general impression with reference to the situation, and I was going to state that I have found throughout the entire West that the provisions of the reclamation law have been accepted with great favor and the people are extremely anxious to participate in the benefits which the reclamation act permits to be extended to their own particular localities.

Mr. REEDER. By the building of a ditch—it would probably be an expensive ditch—could we not keep even that minimum flow of Milk River within the United States, so that the people could get the water regardless of Canada?

Mr. GRUNSKY. No; the distances are too great to make that arrangement expedient. It would require a very long and a very expensive canal.

Mr. REEDER. I thought that by pouring it into creeks or rivers pretty well up to the head in the United States that it would be possible to keep it in the United States, and that even without a treaty we could give our people that minimum flow as well as the stored water.

Mr. GRUNSKY. It would be more feasible to take the water and use it on the lands other than those upon which it is used at the present time, but of course the first thought was and is to protect the interests already established, those in the lower Milk River country. That is the desirable thing to do.

Mr. REEDER. If you can not do that by treaty, we can probably do it by ditch and use the water some other place?

Mr. GRUNSKY. It is on those lines that the Department is now operating.

The CHAIRMAN. Your present construction is on the St. Mary River?

Mr. GRUNSKY. It will be on the St. Mary River.

The CHAIRMAN. The construction under immediate consideration?

Mr. GRUNSKY. It is on the St. Mary River, and it relates to the storing of water in the St. Mary Lakes and the construction of a canal which will divert the water eastwardly from the St. Mary River paralleling the Canadian boundary for some distance and extending as far as the south fork of Milk River, from which point a diversion can be made to cover lands in the Blackfeet Reservation and to the east thereof, or if an arrangement with Canada be entered into permitting the water to flow through Canada, the water would be allowed to flow down the South Fork and into the Milk River and then back into the United States.

The CHAIRMAN. With regard to the situation on the Rio Grande, negotiations are on foot with the Mexican Government looking to the settlement of their claims against the United States for water formerly used by their citizens?

Mr. GRUNSKY. On the Rio Grande the situation is different from that on the Canadian boundary. The lands in Mexico on which water is being used have been served with water for a great many years. If the United States carries out its plan of storing the water near the Elephant Butte by the proposed Engle dam it can hold back the entire flow of the Rio Grande River. It can deprive the Mexican lands entirely of a water supply.

The CHAIRMAN. Their water supply for a considerable number of years has been very precarious, has it not?

Mr. GRUNSKY. It has been somewhat unreliable, because there is no storage on the river and they are dependent upon the natural flow of the stream. The stream has its high stages and its low stages. The high stage has often destroyed their headworks or the dams at their headworks, while in times of low water they have had an inadequate supply. If water can be delivered from the reservoir, liberating it as the demands for irrigation require, the Mexican lands can be better served than they have been in the past. The arrangement contemplated with Mexico looks to a protection of the rights which the Mexican irrigators have acquired in the waters of the Rio Grande. It would give them the water in stated amounts and under suitable restrictions.

Mr. KENNEDY. To what stage have those negotiations proceeded up to this time?

Mr. GRUNSKY. There has been a draft prepared to serve as a basis for an agreement with Mexico. There have been some suggestions made by the Reclamation Service with reference to an agreement that might be entered into with Canada. In the matter of the Colorado River the situation has been very much complicated by the change in the river's course which has recently taken place due to the operation of the California Development Company, which supplies water to lands in the Imperial Valley.

The CHAIRMAN. Just at this stage of the situation, Mr. Grunsky, do you not think it would be rather difficult to enter into any agreement with the Mexican Government in view of the fact that we do not know just what is going to happen to the lower Colorado River?

Mr. GRUNSKY. That is very true. It would be extremely difficult to determine just what the responsibility of Mexico is with reference to the damage that may result within the United States due to the change that has occurred in the Colorado River. The California Development Company, operating in Mexico through a subsidiary organization—a Mexican company, a company that was organized under the laws of Mexico—first acquired a large tract of land paralleling the boundary, and on this tract of land constructed a canal which led the water diverted in California to Alamo River, in which it flows to a point about 40 miles west of Colorado River, where it reenters California.

The company operated at first without any concession from Mexico, but finding that their headworks were inadequate to supply to the lands in the Imperial Valley the water that was wanted, there was in 1904 a concession asked for from the Mexican Government which

authorized the company to receive water diverted from the Colorado River in California and conduct it in canals over Mexican lands, and it also gave the right to this company to make additional diversion from Colorado River on Mexican territory. The Mexican company took advantage of this concession and constructed a small canal, usually referred to as a "canal heading," about $4\frac{1}{2}$ miles south of the international boundary, which led from the river to the already constructed canal.

When the high waters of 1905 commenced to enlarge this cut, which was an excavation without head-gate, attempts were made to stop the flow, but the attempts were not successful. One after another was found to be without effect. The heading was gradually enlarged and the unusually high water in November of last year turned practically the entire river in that direction away from its present course. At ordinary stages the old bed of the river is now dry and a large amount of the water flows into the Salton Sea instead of going into the Gulf of California.

The CHAIRMAN. How recently have you been informed in regard to the situation there?

Mr. GRUNSKY. I was there myself and at the lower intake—the intake I was just describing—this last March.

The CHAIRMAN. The people there seem to be pretty hopeful that the work they are now doing will return the coming summer floods to the old channel. Do you think that hope is reasonably well founded?

Mr. GRUNSKY. There was at the time I was there a possibility that that result might be obtained, but dependent upon very favorable river conditions. I am not sure of the situation there at the present time.

The CHAIRMAN. Would it be possible in case it was found impossible to return the stream to its old channel to redirect the stream at a point some distance down the Imperial canal into some of the parallel water courses running toward the Gulf; paralleling the river and running toward the Gulf? I understand that there are parallel water courses, irregular, but pretty well defined.

Mr. GRUNSKY. There is a possibility of a large amount of water being turned in that direction.

The CHAIRMAN. Even though it may not be turned down the old canal?

Mr. GRUNSKY. The country southerly and southwesterly from Yuma is a delta cone. Where the river breaks through the hills near Yuma it at one time discharged into the ocean at a much lower elevation than the river has at the present day. It has gradually, by bringing down large quantities of silt, built up a delta cone and the river took its course down the slopes of the delta cone in various positions, sometimes southerly, at times down the center southwesterly, and at times along the northern edge of the cone into the Salton basin.

There is no doubt at all that at one time there was a basin filled with water in California with a surface area approximating 2,000 square miles. The river has left such channels as you speak of, and one of them, running down the backbone of the delta cone, is the Paredones River. It has a channel of quite large capacity without a well-defined head. Some of the water flowing over the west bank of the Colorado River at high stages reaches this channel. Occasional in-

flows into the Salton basin have been noted in the past. Colorado River at various times has been high long enough to cause the over-bank flow to reach the basin. One notably high water was that of 1891 when the overflow collecting in sloughs and high-water channels flowed into California to a notable extent.

The CHAIRMAN. There has been some water—high water—flowing into the Salton sink within recent years?

Mr. GRUNSKY. Yes, sir; this has occurred repeatedly. The overflow water that goes southwest from Colorado River in part reaches Volcano Lake. Volcano Lake lies on the summit of the ridge—if I may call a very flat extent of country a ridge—that divides the water which flows northerly into the Salton basin from that which flows southerly into the Gulf of California.

The CHAIRMAN. What is the general condition of your work and operations throughout the country?

Mr. GRUNSKY. The general condition is very satisfactory.

The CHAIRMAN. You are getting along satisfactorily with your contract work generally?

Mr. GRUNSKY. The general situation is very favorable. There are troubles here and there. There have been failing contractors. The work does not always, when awarded to the lowest bidder, fall into the hands of contractors who are in every way competent to carry it out, and failures of that kind must be expected under the circumstances. When a failure occurs attempts are made to relet the work. In some cases it has been necessary to carry on the work under force account.

The CHAIRMAN. As a matter of policy, what is your opinion as to the advisability, outside the question of the authority of the Department under the law, of carrying on work by force account rather than by contract?

Mr. GRUNSKY. I think that whenever work can be clearly and definitely described it is desirable to let the work by contract. There may be cases where it can not be done, when the circumstances are such that force account should be considered, but the general policy should be to let the work by contract.

The CHAIRMAN. In carrying on the work by force account you necessarily accumulate a good deal of machinery and material that may or may not be of value after you get through.

Mr. GRUNSKY. That is true. Some classes of work involve very expensive machinery. Perhaps the best example of that would be our entering upon the manufacture of cement. When cement was not obtainable at a price that was deemed to be reasonable in the case of the Roosevelt dam, a cement mill was erected and cement is now being manufactured. This cement is costing the United States very much less than cement would have cost if it had been bought from the cement manufacturer.

Mr. MARSHALL. What will you do with this mill; do you figure that in the cost of the cement?

Mr. GRUNSKY. That will be figured into the cost of the cement to the Government.

The CHAIRMAN. The probability is that that plant will be of very little value in that isolated locality when you are through with it?

Mr. GRUNSKY. Yes, sir.

Mr. KENNEDY. Is it not also true that the cement is being manufactured at such a price and so much more promptly that it will virtually pay for itself before you are through with it?

Mr. GRUNSKY. It will; that is the situation.

Mr. MARSHALL. Was that on account of the exorbitant price that the contractors asked for the cement or was it largely on account of the difference in freight; you are saving a lot of money in the cost of transportation?

Mr. GRUNSKY. It was a combination of the two circumstances; first, the cost of the cement, and, second, the cost of transportation. The work was very unfavorably situated for the delivery of the cement.

The CHAIRMAN. Since then you have no complaint to make of the bids you have received for cement?

Mr. GRUNSKY. The cement bids have been fairly reasonable.

Mr. KENNEDY. It was also difficult to get the cement there promptly?

Mr. GRUNSKY. It was.

The CHAIRMAN. How have your contract prices ruled, generally, compared with the cost of the work for the past ten or fifteen years?

Mr. GRUNSKY. As a rule they have been satisfactory, but with a tendency toward higher figures. The later bids are somewhat disappointing. They are frequently higher than it was anticipated that the work could be done for, but that is due largely to the fact that there is so much work offering throughout the country and prices generally are rising.

The CHAIRMAN. Your early bids were very low compared with what corporations and others were paying for the same class of work?

Mr. GRUNSKY. They were very satisfactory proposals.

Mr. KENNEDY. Is not the rise in prices partly due to the experience which the contractors have had in executing contracts which they have already taken?

Mr. GRUNSKY. I suppose quite a number of causes could be assigned. That is undoubtedly one of them. The experience indicates that contractors must bid somewhat higher than they did at first in order to make a reasonable profit.

The CHAIRMAN. A considerable number of the failures which you had in the early work indicate that there is not only a lack of profit but a lack of sufficient return to keep the work going?

Mr. GRUNSKY. It is undoubtedly true that some of the work was undertaken at prices that were too low.

With the permission of the committee, I would like to say that it is becoming apparent that the reclamation fund is inadequate to meet the requirements of the country if these requirements be judged by the wishes of the people who would benefit from Government aid as it can be extended under the provisions of the reclamation act. That is very apparent.

Mr. KENNEDY. What do you think as to the prospect for the return of this money to the reclamation fund—that is, what do you think of the success of the plan, judging it not only from the result to the soil, but to the reclamation fund itself?

Mr. GRUNSKY. I think there is no question that in the end the money will come back, that it will become what it is intended to become—a revolving fund.

Mr. MARSHALL. There is no man in Congress, especially east of the Mississippi River, who believes that one dollar will ever be returned; I hope for the reclamation service and believe personally that it will come back.

Mr. GRUNSKY. It seems to me there is no doubt about it. It rests, of course, with Congress. Congress must insist that it be done and the conditions are such that the repayment can be made. The cost of irrigation is such that the landowner can, without any hardship whatever, make the payments he is required to make.

The CHAIRMAN. Unless some very unusual condition arises in some particular locality?

Mr. GRUNSKY. Yes, sir; that is true. We are operating in a large number of states under all kinds of conditions and are dealing with projects that are not sufficiently attractive to enlist private capital; projects that are of such magnitude that private capital can not take hold of them or have some doubtful features connected with them. There may be cases where there will be some disappointment, but on the whole there is going to be a very full compliance with the requirements of the act and farmers are going to be perfectly willing to make their payments. Within a very few years this will be so plainly demonstrated that there will not be any further question in regard to the matter.

Mr. KENNEDY. Do you consider that the work as being carried on, and the work in contemplation, is along practical lines so that it is a wise movement as a whole?

Mr. GRUNSKY. It certainly is. I think it is one of the greatest things that the nation has ever undertaken to make this provision for making the intense cultivation of land possible. The central idea of home building is a splendid one; there is no doubt about that at all, and private landowners are very enthusiastic in the matter. You will be overwhelmed with demands; they will be increasing year by year for an extension of this work beyond the limits that the reclamation fund will permit.

The CHAIRMAN. What is the situation in the country with regard to irrigation development by private enterprise, and what effect generally has the passing of the reclamation law had, in your opinion, upon such development by private enterprise?

Mr. GRUNSKY. Legitimate private enterprise seems to be moving very nearly as it would move without the act. I think that is true in most cases. Now and then there are enterprises undertaken simultaneously with or subsequent to operations by the Reclamation Service and interference is claimed, but in most cases when that is analyzed it will be found that private enterprise is encouraged, not discouraged. The idea is to have water, as far as water is available, used upon land, and whenever private enterprise accomplishes the result which the reclamation act is intended to accomplish it certainly ought to be encouraged, and not discouraged.

Mr. REEDER. Do you think the farmers, under this irrigation provision, would be more prosperous and find it more easy to comply with the payments if the farm unit was lower? Are there places where if the farm units were 10 or 20 acres that the farmer would be more successful and find it easier to comply with the law in repayment than where they are 40, 60, and 80 acres?

Mr. GRUNSKY. That will depend upon local conditions, upon the location of the land. There are localities where markets are so good that the small unit may be the desirable one, but that is in the discretion of the Secretary of the Interior.

Mr. REEDER. No; it is not below 40 acres. The question is would we be justified in placing it in his discretion to make the farm unit still lower down to 10 acres?

Mr. GRUNSKY. There are cases where that would be advisable.

Mr. COOPER. That depends upon the locality. You go into Montana, North Dakota, and Wyoming, and in that section the farm unit ought to be larger than down in the vicinity of Phoenix where they raise fruits and vegetables and things of that kind which require intense cultivation.

Mr. GRUNSKY. The question, as I understood it, was whether it would not be desirable to permit a subdivision into smaller units than 40 acres?

Mr. COOPER. Is not the necessity for small units more, farther down south in the warm climate where the cultivation is more intense for small fruits and vegetables, than it would be farther north for grain and alfalfa and sugar beet?

Mr. GRUNSKY. I think that is true, and for that reason more latitude should be given to the Secretary.

Mr. COOPER. Putting it in the discretion of the Secretary of the Interior?

Mr. GRUNSKY. That would be the proper way.

Mr. COOPER. Do you not think the success of this irrigation movement depends largely upon whether or not there is a prompt and satisfactory return to the reclamation fund of the money that is charged upon these lands?

Mr. GRUNSKY. That is also very true.

Mr. COOPER. Do you not also think it is better not to spread over more ground than there is a prompt and vigorous demand for as you go along? For instance, if you put too much land on the market would there not be a tendency to cheapen the land and also endanger the success of the enterprise?

Mr. GRUNSKY. The various projects are so widely distributed that although they reach a great aggregate area the demand for irrigated land is also very great.

Mr. COOPER. The greater the demand the more the enterprise will be successful, I should think. If land is cheap the farmer could not pay so much for the water rights as he could where the land is higher in value?

Mr. GRUNSKY. That is true.

The CHAIRMAN. Is it not true in view of the fact that the demand for construction by the Government is much greater than your ability with your present funds to provide, that it is fortunate that private enterprise has not been discouraged, but if possible legitimate private enterprise encouraged by the passing of the reclamation law; and is it not also true that the development by private enterprise will aid in the exceedingly important work of obtaining returns in view of the fact that every construction of an irrigating ditch by a private enterprise and every purchase of irrigated lands irrigated by private enterprise, as well as those that are awaiting further

governmental development, that all those people will be insisting upon the repayment to the Government of the money expended, and all those powerful agencies will tend to create a proper public sentiment in the western country?

Mr. GRUNSKY. I think it will, and every time an enterprise is carried out with success it stimulates new enterprises.

Mr. COOPER. Last June, when we made the trip to the irrigation country in the West, one thing I observed was that there was so much attention given to this work, so much interest being manifested in it, everybody who was farming with more or less irrigation becoming enthusiastic over the work, and that it was increasing interest in farming and development and in the improvement of conditions so that the general effect upon the communities would be not only where you are putting in ~~these new~~ projects, but everywhere——

Mr. GRUNSKY (interrupting). To a very marked degree.

Mr. COOPER (continuing). And I wondered if you had the same impression. That was my observation.

Mr. GRUNSKY. Yes, sir. My recent trip to the Pacific coast brought me into Sacramento Valley, in which lands are all privately owned, many of the landowners owning large tracts of land. They are coming around very rapidly to the idea of subdividing and of taking advantage of the terms of the reclamation act, asking for Government aid. They want it. They want a great Sacramento project, and if it is ever carried out that will be one place where there will be no doubt about the repayment of the funds. You can not find any community more anxious to have it. There is a strong sentiment in favor of Government aid along lines similar to those laid down in the reclamation act.

All that we of the Reclamation Service can do is to point out the local situation and to give Congress to understand just what it is, and then it will rest with Congress to determine upon the wisdom of acting in the matter. The situation in the Sacramento Valley is such as to merit the extension of aid at the present time, but a comprehensive project is out of reach for a great many years unless more money is made available. The proper basis for the discussion of a definite Sacramento Valley project has not been laid; it has not been definitely planned; the estimate of the cost is not before you, and it is not known what amount of money is required. That information should be made available for Congress.

The CHAIRMAN. Could you not in the meantime if you have the funds carry out some one link of that project, some sub-project connected with the main project of the development?

Mr. GRUNSKY. The matter is complicated by the lack of funds. The projects already undertaken, and their gradual extension to the intended limit, will for a number of years absorb all the money as it comes into the fund.

The CHAIRMAN. Is there anything further that you wish to say in connection with the working of the law that might be improved by amendment, although we are pretty conservative in that connection?

Mr. GRUNSKY. I think it is wise to be not too hasty.

STATEMENT OF MR. C. D. WALCOTT, DIRECTOR, RECLAMATION SERVICE.

The CHAIRMAN. Mr. Walcott, if it is agreeable to you and to the members of the committee, I would like to ask you some questions in regards to appointments and salaries. How are the appointments made in the Reclamation Service?

Mr. WALCOTT. Mr. Chairman, if I may, I will go back to the organization of the Reclamation Service. In 1902, at the request of the Secretary of the Interior, we submitted to him a list of the principal officers for the preliminary organization of the Reclamation Service. He approved of that list, which was a skeleton of the organization.

The CHAIRMAN. Who were those officers?

Mr. WALCOTT. Mr. Newell, the chief engineer, and Mr. Davis, the assistant chief engineer, and various heads of the field districts.

The CHAIRMAN. They were practically all men already in the Government service?

Mr. WALCOTT. They were all men who had been in the hydrographic work of the Geological Survey. If I may go back still further, as you all know, the irrigation work came in connection with the Geological Survey through Maj. John Wesley Powell, the former Director of the Survey. He was deeply interested in the subject of irrigation in the West, and both wrote and spoke upon it for a decade or more. In 1892 the Geological Survey was bitterly attacked for the supposed position taken by the Director in regard to the lands of the West. That resulted in the practical ordering out of the irrigation work of the Geological Survey previously authorized by act of Congress in 1888.

The CHAIRMAN. Major Powell was ahead of his time?

Mr. WALCOTT. He was a decade or more ahead of his time, and his ideas and general plans were practically those that have been since developed and carried into effect.

In the spring of 1894, before taking charge of the Geological Survey, I asked Major Powell who were the men best adapted to take hold of hydrographic work in the West and throughout the United States. He said that in his judgment of the younger men—I told him I thought it would take a long time before the plans would be matured—that Mr. Newell and Mr. Davis were the two best of the younger men he had. I asked that I might see them and talk with them. In 1894 a request was made of Congress for an appropriation of \$25,000 for hydrographic work to continue in part the irrigation work authorized in 1888. We received finally from Congress \$12,500.

Mr. Newell was requested to take charge of the organization of the hydrographic work, and he was assisted by Mr. Davis. The next year that appropriation was increased, and so on until it reached \$200,000 by 1898. That work included the gauging of streams and the study of hydrographic conditions all over the United States and especially in the West with relation to irrigation projects and irrigation possibilities. In 1902, when the irrigation law finally passed, that organization, the hydrographic branch of the Geological Survey, became the nucleus of the Reclamation Service. The framework was practically all ready upon which to build up the Service. The hydrographic work was under civil service regulations, and the Reclamation

Service was continued in the same lines. Since then appointments to the Reclamation Service have been by civil service examination or on the evidence of capacity or of work done to justify their appointment direct, as in the case of Mr. Grunsky, by the President.

The CHAIRMAN. The appointments are now made either from the civil service list or outside the civil service list, where, in the case of engineers, you find men peculiarly adapted to the business?

Mr. WALCOTT. Consulting engineers and men of high grade who are peculiarly adapted to perform the work.

The CHAIRMAN. In the main, the appointments are made through the civil service?

Mr. WALCOTT. Entirely, or by transfer from other Government bureaus.

The CHAIRMAN. You have special civil service examinations for reclamation work throughout the country from time to time?

Mr. WALCOTT. Whenever men are needed, and there are none on the list, examinations are held throughout the country under the usual civil-service rules. The technical part of the examination is prepared by the officers of the Reclamation Service, and the ordinary civil-service examination is prepared by the Civil Service Commission.

Mr. MARSHALL. In that respect it is no different from any other bureau?

Mr. WALCOTT. No, sir.

The CHAIRMAN. Then your men are civil-service men?

Mr. WALCOTT. Yes, sir.

The CHAIRMAN. And are now appointed in the same way as men are appointed in the other service?

Mr. WALCOTT. Yes, sir. As soon as the Reclamation Service was started in 1902 the general rules affecting the service of the Geological Survey were applied to it and the same procedure followed. That is, the Director of the Survey, having the list of candidates furnished by the Civil Service Commission, nominates to the Secretary of the Interior, who approves of the nomination of the person for employment and issues the appointment.

The CHAIRMAN. You have found no difficulty in getting all the engineers that you needed—men of considerable experience?

Mr. WALCOTT. No, sir.

The CHAIRMAN. Both for planning and construction?

Mr. WALCOTT. For all necessities of the service.

The CHAIRMAN. There has been some criticism, not in the country generally, but here and there and somewhat in the other bureaus, that your salaries were a little high—that is, the salaries of your supervising engineers and your construction engineers and that class of men. The salaries of the supervising engineers average about \$4,000 a year, do they not?

Mr. WALCOTT. I do not recall from memory, but they run from \$3,500 up to \$4,200.

The CHAIRMAN. Mr. Hill receives \$4,000; Mr. Lippincott, \$4,200; Mr. Quinton, \$4,200; Mr. Savage, \$4,200, which seems to be about the average salary of a supervising engineer. Mr. Wells receives \$4,000 and Mr. Taylor \$3,600. Now, how do those salaries compare with the salaries paid in private employment to men of about that class?

Mr. WALCOTT. I think they average lower than the salaries paid elsewhere for equal services and responsibilities. Take the case of Mr. Hill at the Salt River project, or the Roosevelt dam, and the responsibilities that he has there in the way of supervising the construction of that great dam and looking after the questions connected with the distributing system, and the questions affecting the relations of the water users to the Government. It requires a man of unusual aptitude and ability. I doubt if any private enterprise of equal magnitude was ever conducted by a man who did as much and assumed as much responsibility for as little money—that is, within modern times. I think if you will compare the cost of the engineers' service of projects like the Metropolitan Water Board work of Boston and the municipal water supply of New York, projects that are of a similar magnitude, you will find that our men are paid smaller salaries in proportion than for those projects.

The CHAIRMAN. Your constructing engineers receive from \$2,500 to about \$3,000 on an average?

Mr. WALCOTT. Yes, sir.

The CHAIRMAN. You think those salaries are no higher than those which the same class of men would receive in private employment?

Mr. WALCOTT. I think not, as far as I have been able to learn, and I find from time to time men are willing to work for the Reclamation Service for less money than in private employment. That is, engineers, with their professional interest and pride and the possibilities of future growth will take positions in the Reclamation Service that they would not accept for the same compensation in private life. In the one view there is permanence and the possibility of development, and, if they succeed, of advancement.

The CHAIRMAN. And the further fact that if a man is successful in his work, that the Government work is a little more widely advertised than private work, and in that way it might call attention to his success?

Mr. WALCOTT. I do not know as to that. A true engineer, with the right spirit, is a man who wishes to carry out the work, and if connected with a good piece of work his professional pride will sustain him in his desire to serve faithfully and to be connected with what you might call a monumental work. I regard this reclamation work as practically the monumental work of the Government.

The CHAIRMAN. I think it is entirely laudable that a man should desire to do his work well, because it is important to him from a personal standpoint in view of the fact that it widens the opportunities for future employment.

Mr. WALCOTT. Certainly. We find in various branches of our service that men with reputations for good work are frequently offered higher salaries and wider operations outside. The large number of resignations this year has been especially notable. We have lost within the last year two men who have left the service at \$2,700 and gone to places where they get \$5,000. In the Government service the men are restricted from taking personal interest in anything under survey or examination or construction by the Government. In a private company if an engineer has charge of an irrigation project there is no objection to the purchase of land by him or his family, and if the value advances, selling it. He can not do that in the Reclamation Service.

Mr. KENNEDY. What allowances are made to the engineers for expenses in addition to their salaries?

Mr. WALCOTT. Where the engineers are traveling in the field their subsistence is provided.

Mr. KENNEDY. So while they are in the field they have no living expenses which are not met by the Government?

Mr. WALCOTT. Their lodging, their tents, and their food are furnished.

Mr. KENNEDY. Take, for instance, while they are in Washington, called in for purposes of consultation or other purposes, does the Government pay their expenses here?

Mr. WALCOTT. The Government pays their expenses for a short length of time.

Mr. KENNEDY. Then the theory is to pay their legitimate expenses while actually engaged in the reclamation business?

Mr. WALCOTT. Yes, sir. The actual and necessary traveling expenses are refunded on presentation of proper vouchers.

The CHAIRMAN. You pay their traveling expenses?

Mr. WALCOTT. Yes, sir; when they are ordered back and forth.

The CHAIRMAN. In the case of a constructing engineer who is comparatively permanently located, he has his quarters and his board—his living expenses—does he?

Mr. NEWELL. I can give you, perhaps, a better explanation. A regular appointee when traveling is allowed his actual and necessary expenses, but when he is located at one point and has a definite station or office he is not allowed subsistence. The necessity of the work compels us to furnish him shelter, but only his necessary and actual expenses while traveling are allowed.

The CHAIRMAN. You put up buildings at your various plants, and your men occupy those buildings? Are there any charges made?

Mr. NEWELL. No, sir; not at present, but it is proposed to make a moderate charge in the future.

The CHAIRMAN. As a matter of fact you are now furnishing the men on construction work like that on the Salt River and on the Shoshone with their quarters, and you have at most of those places a boarding house. Do they pay their board?

Mr. NEWELL. There are several classes of men. Those appointed by the Secretary without any reference to subsistence pay their board. Those who are appointed with an agreement to have subsistence as part of their pay are provided with their board. The laborers are employed either at so much per day and subsistence, or so much per day deducting subsistence. In each case it is specifically stated, and the price is fixed in the contract of employment.

The CHAIRMAN. Here we have the men in Arizona—the list of men on page 81 of the statement furnished the committee at the beginning of the hearings—beginning with Mr. Hill and running on down through the list of engineers and assistant engineers and experts, their salaries ranging from \$1,200 to \$4,000 a year. Would those men receive, while on that construction work, their board?

Mr. NEWELL. Very few of them would. Mr. Hill has, for instance, an office on the work. He has a hundred miles to travel from one end of the work to the other. When he is actually traveling he is reimbursed for the expenses incurred in his subsistence. At other

times, if he lives with his family or is at a regular station, he does not get his subsistence.

The CHAIRMAN. I suppose the majority of these men are young men who board at your commissary?

Mr. NEWELL. Some of the men have their own mess, and some others when they are out in camp are furnished their subsistence. Each case depends upon where the man is employed and the conditions under which he is working. There is no general rule excepting that a man's compensation is fixed with reference to the services rendered.

The CHAIRMAN. This list of compensations does not clearly set out in all cases just what a man's actual compensation is for the year?

Mr. NEWELL. It is intended to be graded on the basis of not receiving any subsistence. That is to say, all men are graded on the basis of supporting themselves. In some cases a deduction is made for subsistence and in cases when on a travel status they have subsistence. If they habitually travel, as some of them must, then their compensation is graded accordingly.

The CHAIRMAN. Your consulting engineers are traveling practically all the time?

Mr. NEWELL. Yes, sir.

The CHAIRMAN. And you pay them a per diem in lieu of subsistence?

Mr. NEWELL. At the present time we pay them their actual and necessary expenses. The Secretary has authorized a per diem which will cover in effect those actual and necessary expenses.

Mr. WALCOTT. I stated that in the field the expenses of the men were paid—that is, those who are surveying, who are in camp out in the field, their expenses are paid. Those on construction work where they have permanent quarters pay their own board.

The CHAIRMAN. Before we adjourn I desire to submit a letter from Mr. Newell, the chief engineer of the reclamation service, relative to force account work.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
RECLAMATION SERVICE,
Washington, D. C., May 9, 1966.

Congressional inquiry has been made concerning the extent to which force-account work is being carried on by the Reclamation Service under the terms of the act (32 Stat. L., 388) setting aside the proceeds from the disposal of public lands for the construction of irrigation works.

In section 4 of the reclamation act it is provided—

"That upon the determination by the Secretary of the Interior that any irrigation project is practicable he may cause to be let contracts for the construction of the same in such portions or sections as it may be practicable to construct as parts of the whole project," etc.

It has been held by some that the word "may" should be construed as "must," and that no work can be done except under contract. This view, however, does not seem to prevail, and there is believed to be authority in law for the exercise of judgment by the Secretary as to how far the contract work shall be carried.

The general policy is and has been to do all of the work possible under contract. It has happened, however, that a number of contractors have failed, and it has been necessary to take their tools and equipment and carry on the work under force account until advertisements could be prepared, bids received, and a new contract awarded. In some cases it has been necessary to continue the work indefinitely to completion.

There are, moreover, localities where from the physical conditions it has not been practicable to describe the work in such way as to make a contract feasible. In all cases, however, where the conditions were such that a contract could be readily entered into, this has been done.

In this connection it should be noted that all work under the Government is in one sense done under contract, and that the so-called force account is, when applied to Government work, usually a succession or combination of small contracts, since each item of expenditure results from a definite contract, made in accordance with existing law. Small contracts are made for purchasing supplies, for handling these, for machinery, and for performing various operations. This should be borne in mind in endeavoring to compare force-account work as carried on by a corporation with that under the Government.

In order to ascertain the conditions of similar work by large corporations, notably railroads, in the West, inquiries were addressed to the chief engineers of the principal transcontinental roads. The following compilation contains extracts from the replies received, names being omitted:

A.

"It has been our practice to contract for work that can best be done by means of teams and team outfits, for the reason that the company has been reluctant to acquire a large amount of team outfits, not so much on account of cost of such outfits, but also on account of the amount of attention necessary to keep such an outfit in condition and the expense attached to looking after such an outfit when not in use. A contractor with an outfit of this kind can obtain work at various points, thus keeping the outfit at work much of the time. The company might be able to do this for a portion of the season, but upon the completion of each season's work upon which a large team outfit has been employed the necessity of disposing of the outfit would probably result in it being sacrificed for a small part of its value.

"Outside the work calling for team outfits, the company has for several years past been doing most of this work themselves. This includes the building of bridges upon construction work as well as operated lines, the doing of grading by means of steam shovels and trains, the laying of track, the construction of necessary buildings, roundhouses, terminals, and works of this character; and in fact, all classes of work met with in connection with railroad work has been done by the company direct, and more favorable results obtained than by the letting of contracts, except for work requiring teams, as above stated.

"As to the matter of letting work by contract: The company usually asks for bids from several well-known and responsible contractors. It does not advertise for bids, and will not accept bids except from contractors which it considers responsible and entirely able to carry out the work within the time limit fixed and in the manner specified. Frequently work of considerable importance is let to, responsible contractors without competitive bids of any sort, the price being agreed upon between the engineer and the contractor and approved by the proper official of the company.

"In connection with construction work done by the company direct, we frequently employ team outfits, paying for these team outfits at a fixed rate per day, plus a percentage to cover wear and tear, accounting, etc. Under this arrangement the party furnishing the outfit cares for the same, feeds the teams, and assumes all responsibility concerning them. As a rule, parties having large outfits do not care to do large amounts of work on this basis, but I have no doubt a price could be fixed that would remove this feeling.

"I think it possible that the doing of work direct, rather than by contract, results more beneficial to the company than it might result to work under different conditions, as the engineers are in position to get prompt and economical train service and to employ and transport men for their work with greater facility than a contractor. These engineers are also in position to conform with less friction to the requirements of the service on that portion of the road upon which the work is being done which results in a benefit to the railroad. We also figure that by doing our own work we frequently do it more thoroughly, and consequently get better results than would be obtained by letting it direct to the contractor. The engineer strives for results; some contractors slight the work in order to save expense.

"It is quite possible that there would be objections to contracting for Government work after the manner in which it is sometimes done by railroad

corporations—that is, questions might be raised as to the construction price being the lowest price at which the work might be done. On our work we frequently care more for speedy, careful work than we do far a small item of cost; therefore, in the event of advertising and securing competitive bids from all classes of bidders, we could only throw out the bids of those we thought to be incompetent or undesirable.”

B.

“I have made a practice of asking for bids on large work, although we do considerable—in fact all—of our bridge work and track laying with our own forces. I find, however, when I have a large piece of work to let, if I can agree on prices with a responsible contractor, it is better not to advertise for bids. It is very difficult in these days to secure reliable contractors and almost as difficult to secure first-class men to carry on the work under our own direction, therefore I use my judgment as to the best way of doing the work, and do not adhere to any particular rule.”

C.

“Our experience is that we can do work to better advantage where any considerable amount of it has to be done, by contracting it. Our method is to invite such bidders as we know are responsible, and not to advertise.

“On grade-reduction work, where we have to interfere considerably with operation, we find it to advantage to do the work ourselves.

“There is so much work now in progress throughout the country that contractors, because of this and the labor conditions, are bidding very high, and it is probable that on railroad work, where the railroad has its own machinery and organization, it can do a limited amount of work cheaper than by contracting it.

“We are having all work done by contract that it is practicable so to do. I think the temptation to do work by the day's work is greater at present than it ever was before, because of the conditions that exist.”

D.

“The custom on our work which is followed in constructing new lines or in executing large pieces of construction work is to select a number of the well-known and tried contracting firms and invite them to make tenders on specifications and plans which are submitted to them, awarding the work on the basis of the best terms under which the contractors advise they can complete it. We never advertise, as it invariably brings in a large number of irresponsible and undesirable parties to complicate the question.

“Some of the western roads, I am informed, are in the habit of making a trade with a large contracting firm to do certain pieces of their work, on the basis of cost, plus an agreed percentage. I believe that this system will permit of work being executed more expeditiously, though in my judgment the ultimate cost would in all probability be higher than would be the case were the necessary surveys completed, and the information carefully gotten together to develop the right kind of specification and information, on which intelligent bids could be submitted and the work contracted for.”

E.

“Nearly all of our large jobs, both in the construction of buildings and road-bed, are handled by contracts. It is our custom to ask a few responsible contractors to bid on the work and award the contract to the lowest bidder. We never advertise our contracts, because it is my opinion, and I think is the general opinion, that such method opens the way for a lot of irresponsible contractors to put in bids. On small jobs we generally handle the work by giving it to some well-known, responsible contractor who has done more or less work for us, the price being fixed by this office. We do the bridge work on existing lines ourselves for the reason that we do not care to have contractors working where we have any number of trains running. I think also that our bridge forces are as competent as any contractor and that we save a little money by doing such work ourselves. In referring to bridge work, I refer to both substructure and superstructure. We do not do any work by force account, and I consider such practice very bad.”

F.

"Our practice has been and is to let all of our important work by contract, particularly grading and masonry. There are certain works that we do by force account, namely, the sinking of foundations below low water, which work is too uncertain to let by contract.

"In general I should say that everything that possibly can be let by contract should be so done, and the force accounts limited to as small an amount as possible."

G.

"It is our practice to build by contract all grading, whether main line, branches, or line and grade changes and bank widening; also for all steel bridge erection, and sometimes for bridge painting, wherever the same is a large job. We find this to be cheaper, more expeditious, and altogether more satisfactory. On some emergency work like washouts demanding prompt repair, we sometimes employ teams on force account upon an agreed basis per team and driver and a percentage to cover repairs to outfit and profit to the contractor.

"Track laying and ballasting and water stations we do with our own forces, and we also erect with the same forces any small buildings, but contract roundhouses, machine shops, large depots, freight sheds, etc.

"In a word, whenever it is feasible to do so, we let our work. It would be uneconomical on a system like ours which embraces but a little over a thousand miles to keep a considerable construction organization to execute the works that are ordered from time to time, as there are often intervals between the finishing of one job and the commencement of another when there is insufficient work in hand to keep such an organization employed.

"In the maintenance department practically everything relating to the conservation of the property and the erection of small betterments is done by company forces. Steel bridge erection and the construction of extensive buildings, however, is generally given out to contract."

H.

"Our present practice is not by any one method, but varies according to circumstances. As a general principle, it is inexpedient for a railroad corporation to be equipped with tools and appliances, including horses, mules, etc., for railroad construction, and especially for desert railroad construction, unless there is a certainty of its going on continuously for long periods; and even then, as a rule, the work can be contracted for more cheaply than the company themselves can do it, for certain reasons which partly pertain to human nature. It is on the same principle that contractors who take a large contract frequently find it expedient to sublet part of it to men who are expert in railroad construction and who give their personal attention to the proper handling of the work and all resulting economics, these men making money in some instances at sub-contract prices, together with the principal contractors making money, where if the large contracting firm themselves undertook it they might lose.

"Our general custom is to let contracts for the following work, viz:

"Grading.

"All classes of masonry.

"All classes of buildings.

"Erection of steel bridges and construction of trestle bridges, the company furnishing the steel bridges f. o. b. cars, and the company furnishing the material for trestle bridges f. o. b. cars.

"Driving tunnels, including their timber, the company furnishing the tunnel timbering material.

"Building of docks and wharves.

"In general, everything except track laying and ballasting, which is generally done by forces on the company rolls.

"We, however, radically depart from this practice in certain cases, for instance:

"In building the many miles of trestle (under unusual conditions), part permanent and part for temporary use to be thereafter filled, and in the work of filling such portion of the trestle, the work was all done by men on the company roll, the contingencies of this work being such that no contractor seemed to have

experience enough to bid on it at any prices which we could consider, and it was thought best to do the work ourselves, and thereby assume the profits or losses on a work of this magnitude, and in particular for the reason that speed was desired in construction and the contingencies were liable to be such as to induce a contractor to save money by lack of progress in some cases.

"Another special case is on the construction of a railroad where there is a large amount of double-track tunneling, involving excavation for the tunnel of a width of 37 feet, generally in very bad ground to hold, the 37 feet width being due to tunnels inside the masonry lining having a clear width of 30 feet, and the masonry lining and necessary extra excavation amounts to about 3½ feet more on each side than the clear width of the tunnel. It was thought best to do this work under the immediate direction of our assistants who are most experienced in tunneling, hiring the men on our own rolls.

"The method of doing work by well-known contractors on a basis of cost plus profit is an exceedingly bad one, and we adopt this method only in some special cases where it is very difficult for both engineer and contractor to judge in advance the cost of the work, and where the engineers for any reason do not care to handle it themselves by men on their own rolls.

"Our practice has been to do only small amounts of work in this way, such as clearing and grubbing, where the amount of timber or clearing and grubbing per acre was exceedingly variable and uncertain, making an acreage price difficult to adjust; and also to do any minor work not contemplated by the contract by contractor's forces for cost and profit rather than by the gangs on the company's rolls for such minor work.

"Where a large amount of work is done for cost and a percentage, you will notice that the temptations to increase the cost and also the percentage are very great, and it is my opinion that it is almost impossible to get even laborers to work as energetically under these conditions as when they know that they are working for the contractor doing the work on contractor's basis.

"We very rarely advertise for bids, but on the contrary send invitations for bids to contractors that we are convinced are equipped properly for the work in question."

I.

"In the construction of new lines and the revision of present lines, it has been the practice of this company for a few years past to handle the grading, bridging, tracklaying, ballasting, and building work on the basis of cost plus a percentage. We have selected thoroughly reliable contractors and made them our agents in handling the work, they, as far as possible, letting the work to responsible subcontractors at prices approved by the Chief Engineer.

"In regard to masonry work, steel bridges, shop buildings, permanent depots, etc., our practice is to ask for competitive bids upon plans and specifications in the ordinary way."

J.

"It has been the practice to have all grading for new lines done by contractor, the contract being awarded after competitive bidding, although usually we ask for bids from only a limited number of contractors whom we know are thoroughly reliable. Our steel bridges are erected by company force, the structures being fabricated by one of the large bridge companies. Pile bridge work on new lines is sometimes done by company force and sometimes by contract. Ordinary station buildings are always erected by company force, but we sometimes contract for larger buildings, such as important depots, shops, etc."

K.

"Wherever the company can do the work and are properly equipped for it, so that it can save the percentage that is paid to contractors, which, of course, means a good organization, I think it ought to do it.

"Wherever it is a question like grading on new lines, the railroad company never has that organization, nor has it the subcontractors at call that good experienced contractors have at their disposal, and all that class of work, I think, should be let by contract.

"I do not believe in letting contract to a contractor, except in very exceptional cases, on the cost plus percentage. The company has not looked at it in this light in the past, but is gradually coming to it."

I.

"Experience in this part of the country leads us to prefer doing work under the old plan of advertising and awarding contracts, where the nature of the work permits. By this I mean we make it a rule to perform all work with company forces when caution must be maintained to insure safe passage of trains. We therefore do all track work with our own men, and particularly all bridge renewals and erection. I would prefer contracting masonry where the amount justifies and a reliable contractor can be had who is experienced in the particular class of work under construction.

"We are opposed to payments on basis of force account plus a profit, as removing the incentive for quick execution and making the cost excessive. Our practice in extensions of the road is to award contracts in the usual way for grading, and construct the track and bridges with our own forces."

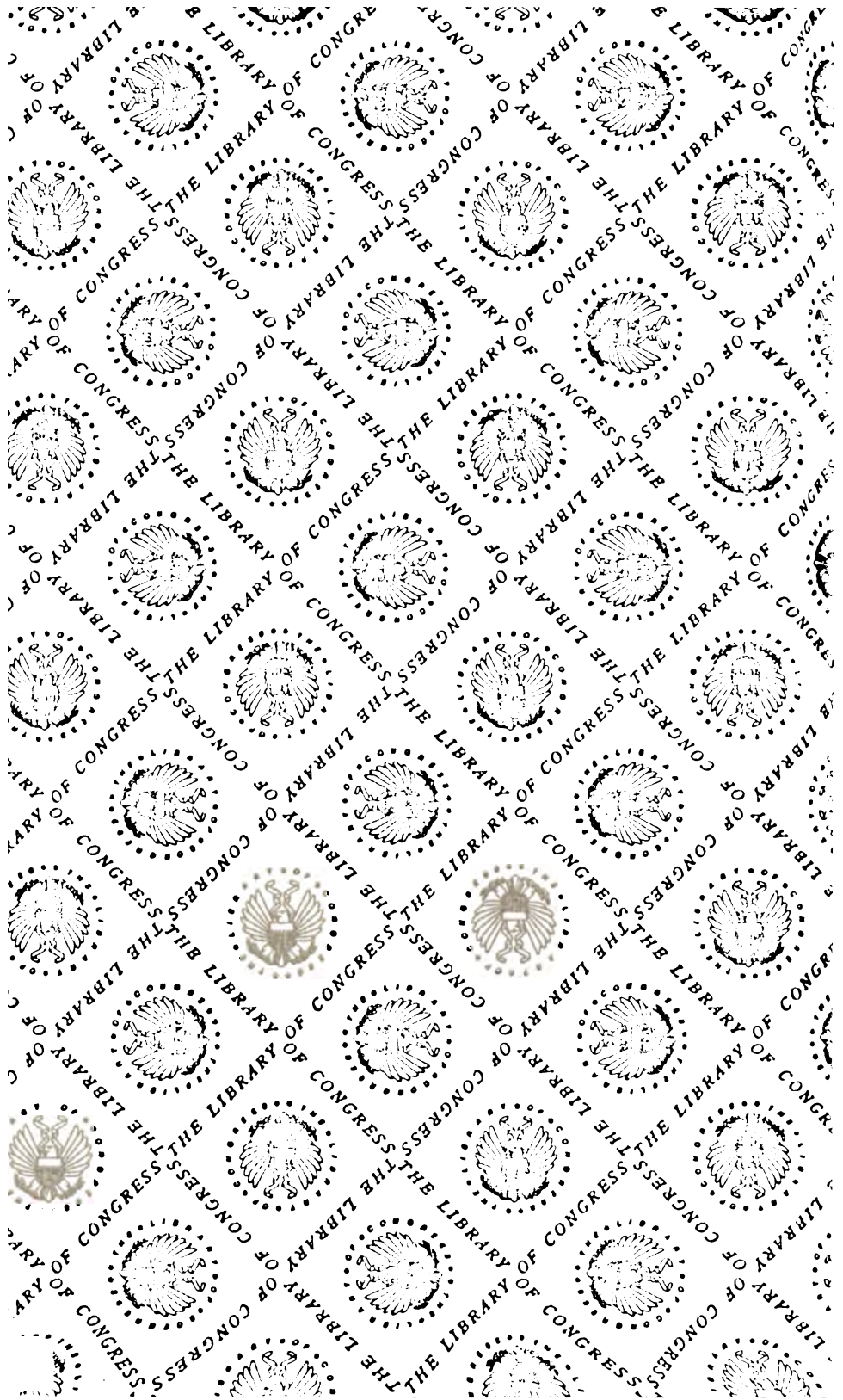
F. H. NEWELL, *Chief Engineer.*

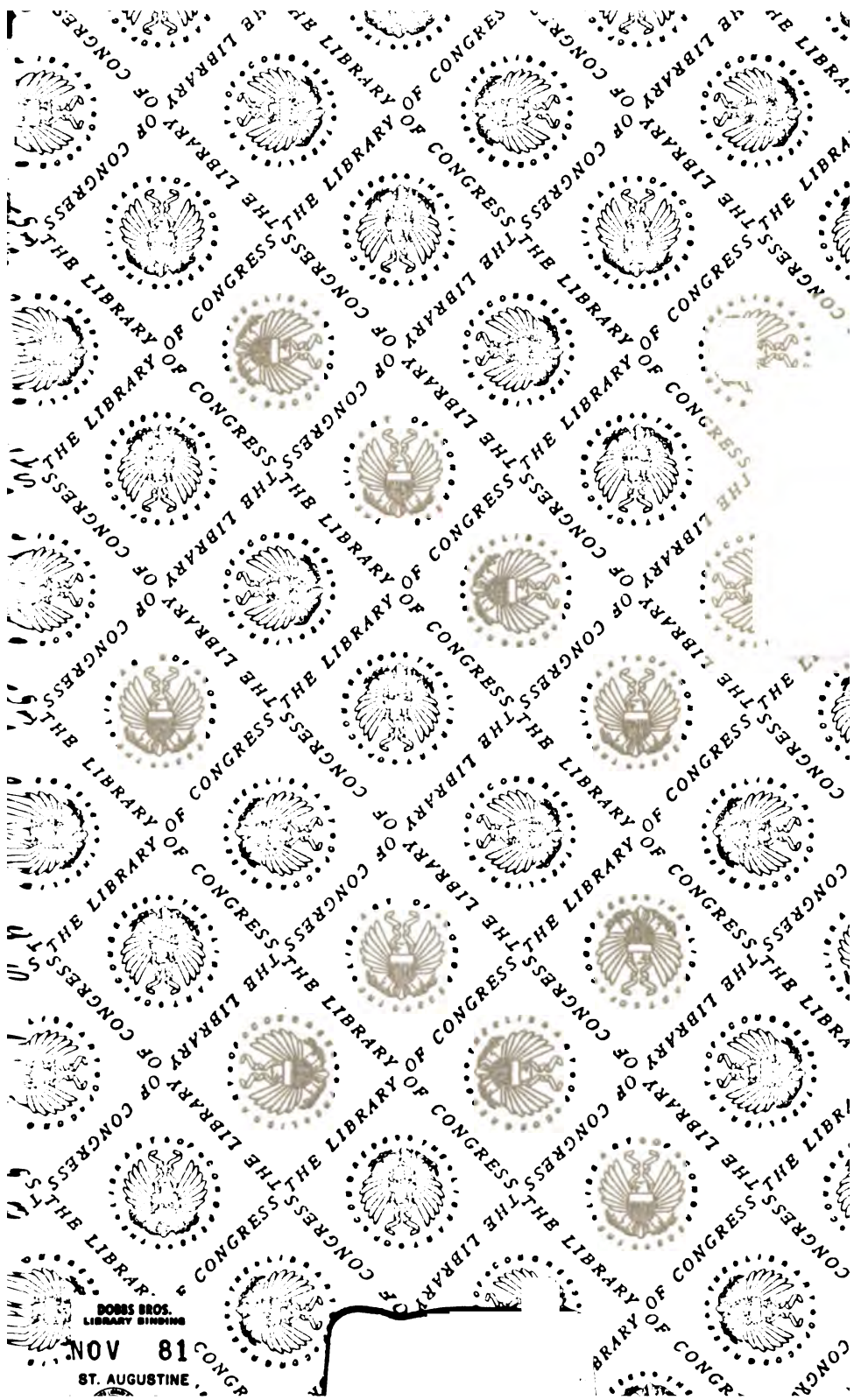
Thereupon the committee adjourned.

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